SOUTHERN POWER AND INDUSTRY

Ad Index, page 138

DECEMBER, 1953

In This Issue

2,000 Pound Boilers
330,000 Volt Line

"Power Firsts"
Appalachian Electric Power Company
Charleston, West Virginia

starts page 66

For materials handling, instrumentation, operation, maintenance, personnel, and shop methods—see Contents on page 3.

Plant Maintenance
One Card System
See page 80

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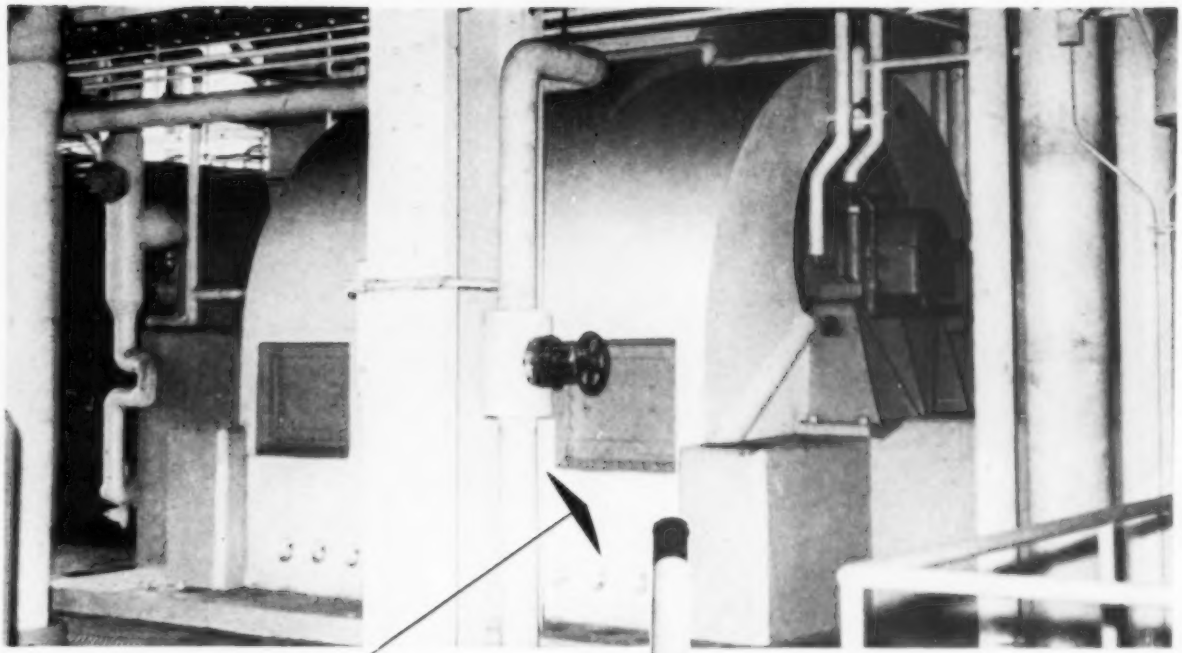

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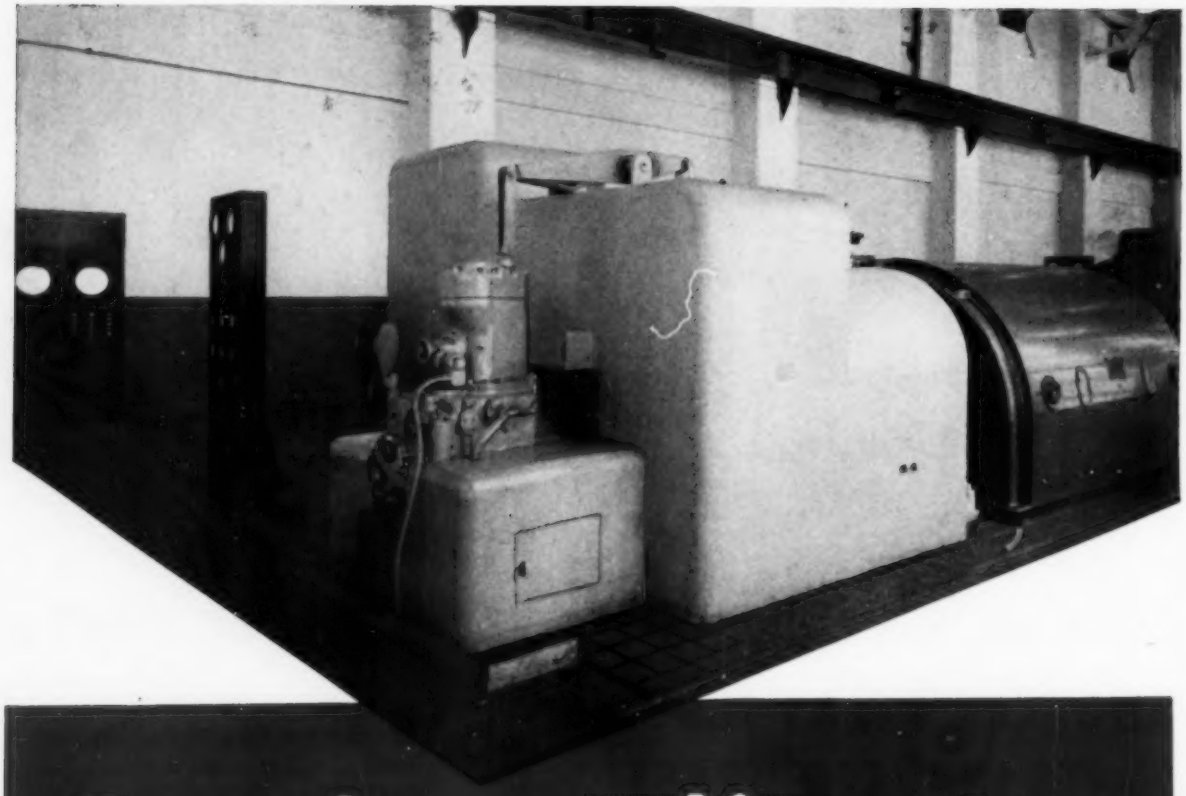

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DECEMBER 1953

Vol. 71 No. 12

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Feature Articles in This Issue

Design, Operation and Maintenance

2,000 Pound Boilers—330,000 Volt Lines 66
Appalachian Electric Power's Kanawha River Plant

Conveyor Belt System Helps Classify Materials 73
Profitable reclamation in Virginia railroad shop

Impact Tool Speeds Mill Maintenance 74
Applications at Abney Mills, Anderson, S. C.

Instrumentation Important Factor 76
Savannah Electric and Power Company expansion

Control of Packaging Materials 78
How new method paid off for N.C. plant

One Card Maintenance System, by Robert J. Tucker 80
Plant-tested method from Roanoke Mills, N. C.

Detector Protects Chipper Knives 82
Metal detected in Alabama mill's wood waste

Diesel to Dual-Fuel Operation for Teague, Texas 83
Conversion offered lower fuel costs; less maintenance

Orientation Trend Shows What Makes Lion Tick 84
Top management actively participates in program

Helping the Man-in-the-Plant

Radiant Oven for Drying Latex 86
Water Well Acidizing 86
Woven Wire Slings 88
What Does Grounding Imply? 92
Die Cleaning Method 96
Drive Regulates Water Flow 96
Waste Chip Receptacle 98
Casting Repair Method 98
Crates "Locked" on Trucks 99
Lift Truck Warning Bell 100
Shaft Alignment Method 100
Lime Kiln Repair 102
Guide for Switchgear 102
Pick Them Up Diagonally 102

Regular Features — Departments

Facts and Trends 4
New Equipment 8
Buyers Information 16
Timely Comments 63
Industry Speaks 65
News for the South 104
Future Events 104
Books for the Engineer 134
Free Literature 135
Index to Advertisers 138

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Facts and Trends

FOR SOUTHERN INDUSTRIAL AND POWER EXECUTIVES

December, 1953

► SEVERAL POWER "FIRSTS", established by Appalachian Electric Power Company's Kanawha River Plant near Charleston, West Virginia, are described in this issue. Plant design features include the largest generating units of their type and the largest boilers ever built, serving the highest voltage (330,000 volt) transmission line in this country.

High pressure turbine operates at initial steam pressure of 2100 psi and 1050 F. Generator voltage is 18,000. Thermal economies will result in a heat rate of 9000 Btu/net kwh. Large size of units and compact design results in the extremely low building volume of 19.3 cu ft/kw, including all service and office facilities, and with all equipment housed except precipitators, fans and heaters.

► MAINTENANCE MEN in the Baltimore and Ohio Railroad Company shops have a new girl friend known affectionately as "Moly." A recent issue of the B & O Magazine says she hails from the hills of Colorado with the real name of "Molybdenum Disulfide." The claim is that she can do things that no other lubricant can do. B & O makes solid lubricating sticks from Moly and suitable binding agents.

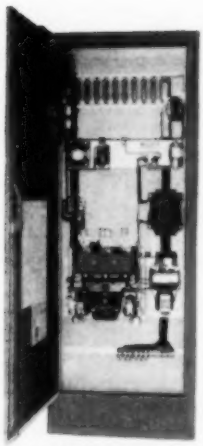
Moly has characteristics which make her better than anything else as a lubricant for certain applications. Unlike solid graphite, she is effective under conditions where moisture is either present or absent. She will lubricate at temperatures ranging from −40 to +700 F, and does not conduct electricity. B & O lubricating engineers are now conducting extensive applicational tests.

► WATER RESOURCE STUDIES of value to planning groups and private industry on nearly any section of the South and Southwest are available free of charge from the Director, Geological Survey, Washington 25, D. C. Circular No. 221 covers the larger public water supplies in the West-South Central States; No. 269 the South Atlantic States; No. 254 the Birmingham, Alabama, area; and No. 148 the Atlanta, Georgia, metropolitan area. Water demands in relation to the source and available supplies are discussed.

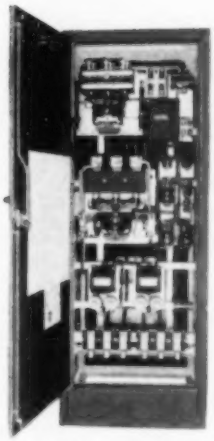
► STRANGEST CRAFT SINCE NOAH'S ARK is Freeport Sulphur Company's 200 ft, specially-constructed steel barge towed to and resting on an oyster shell base laid on the bottom of Bay Ste. Elaine in the Louisiana marshland. The unique "amphibious plant" is expected to produce about 100,000 tons of sulphur a year when in full production.

Five B&W Integral-Furnace boilers sitting on top of the barge can provide 30,000 lb steam per hr each for turbine-driven blowers, turbine-electric generators, and to heat sea-water for the sulphur mining operation. The water is preheated directly by the boiler flue gas passing through heat exchangers.

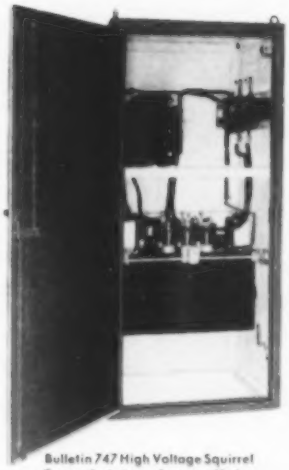
(Continued on page 6)



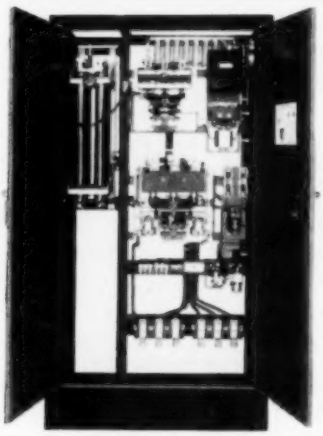
Bulletin 906 Low Voltage Synchronous Motor Starter—Full Voltage Type—Automatic Operation



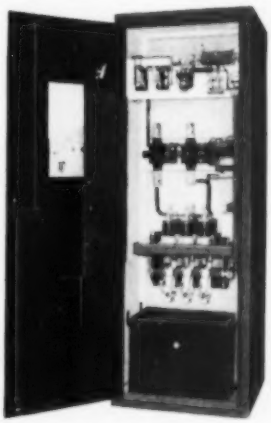
Bulletin 742 Low Voltage Squirrel Cage Motor Starter—Stepless Resistance Type—Automatic



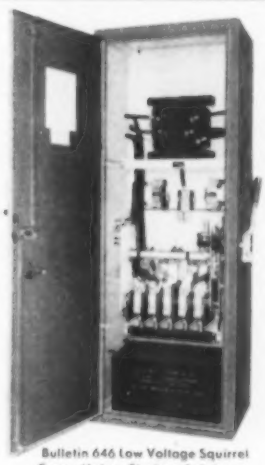
Bulletin 747 High Voltage Squirrel Cage Autotransformer Motor Starter—Automatic Operation



Bulletin 914 Low Voltage Synchronous Motor Starter—Resistance Type—Automatic Operation



Bulletin 726 High Voltage Squirrel Cage Motor Starter—Full Voltage Type—Automatic Operation



Bulletin 646 Low Voltage Squirrel Cage Motor Starter—Autotransformer Type—Manual Operation

Starters for High and Low Voltage Motors

The high quality of design and construction, which has made the Allen-Bradley line a leader among motor starters, is built into Allen-Bradley starters for big motors, too.

These big starters can be supplied with all standard accessories, such as contactors for controlling auxiliary equipment, meters and instruments, current limiting fuses, etc. At maximum rating these starters have an interrupting capacity of 10 times motor full load current.

Standard features of A-B synchronous starters include polarized field frequency relay, automatic resynchronization, thermal overload relays, out-of-step relay, and undervoltage protection. Reduced voltage starting is available either with resistor or autotransformer control.

Standard features of the big A-B squirrel cage motor starters include overload relays. Current limiting fuses are recommended for all high voltage starters.

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facts and trends (continued from page 4)

► GET MORE FOR YOUR STEAM TRAP DOLLAR keynotes Sarco in describing their inverted bucket trap with "Camlift" valve mechanism. Greater discharge with no increase in trap size is the feature. They want you to put it to the test and offer a ½" Sarco Type B bucket trap for free trial. Write Sarco Company, Inc., Empire State Bldg., New York 1, N. Y. and give maximum working pressure..psi; and capacity..lb/hr condensate.

Design features cams which act as fulcrum points to lever the valve off seat. As bucket sinks "Camlift" mechanism provides crowbar action needed to open a large valve against steam pressure. Slot and pin arrangement provide maximum valve opening. When steam pressure is overcome, mechanism drops to limit of slot, allowing discharge of condensate.

► PANORAMA OF LUBRICATION is a series of worthwhile publications being prepared and issued by Shell Oil. Latest is MACHINE TOOLS AND THEIR LUBRICATION, an 80 page discussion of methods used in controlling power and directing force, types of motion and degrees of friction, and the role of the lubricant in operation and maintenance. Ask your Shell lubrication engineer for a copy or write Shell Oil Company, 50 West 50th St., New York 20, N. Y.

► WHAT IS DEMINERALIZATION and how is equipment selected? When should you use three or four-bed rather than two-bed demineralizers? Mixed bed? How should one figure operating costs? Write Cochrane Corp., 3110 N. 17th St., Philadelphia 32, Pa., for a free copy of their 38 page "Handbook on Demineralizing", which answers these and similar questions.

► MORE HEAT RESISTANT ALLOYS will be available with the lifting of Government NPA order M-80 limiting the use of nickel. Typical is NA22H developed by the National Alloy Division of Blaw-Knox Company, which can be used at temperatures up to 2200 F. Application heretofore has been limited by the Government to special applications above 2000 F, but because of superior structural stability and resistance to oxidation, the alloy also shows savings in many uses in the 1700 to 2000 F range.

► EQUIPMENT AND METHOD BRIEFS for the plant engineer--Perhaps many of your WIRE SPLICE JOBS can be handled WITHOUT WINDING. SCI Sales Co. say the cohesive properties of their cable splice rubber tape make it possible to apply it lengthwise by pinching.

As the flux rather than an electrode supplies the alloy content of the deposited metal in Lincoln Electric's new hardsurfacing technique, you can HARDSURFACE WITH A MILD STEEL ELECTRODE.

Pennsylvania Pump has developed air and gas COMPRESSORS WITH SECTIONALIZED CYLINDERS facilitating any service problem involving piston rings, piston or liner.

Guide wheel automatically raises or lowers beveling torch on National Cylinder's portable cutting machine to COMPENSATE FOR SURFACE IRREGULARITIES in steel plate.

Going to invest in dual fuel to utilize gas? It's no longer necessary says The Webster Engineering Company--just add the gas with their Rectilinear Gas Burner. Packaged unit makes four inches pressure do the work of four pounds with fractional horsepower.

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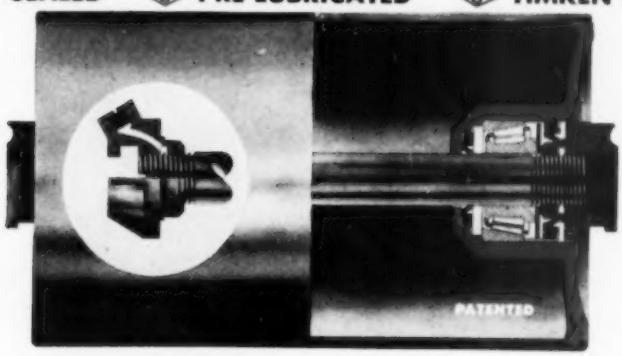

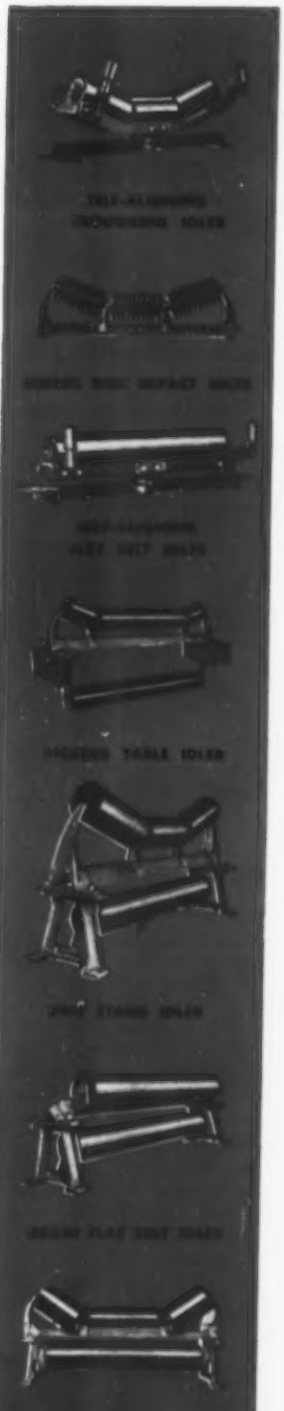

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For detailed information on these idlers write for Bulletin S.I.-116

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Caulking Compound Supplied in Tape Form

L-1 PRODUCTS RESEARCH COMPANY, 3126 Los Feliz Blvd., Los Angeles 39, Calif., is offering a new, easy to use caulking compound in tape form.

Products Research Company's 620 tapes have temperature range from —25 to 250 F over extended periods.

The tape has a soft, moldable consistency with a thread core that prevents stringing out or sagging when unrolled. Its primary application is that of a low cost joint sealer against moisture, wind, dust and cold. When placed between two surfaces, and light pressure is applied, the compound distributes itself evenly throughout the joint. Its ability to be thumbed into cracks and crevices offers additional value as a plugging compound.

Wire Thread Inserts

L-2 HELI-COIL CORPORATION, 1427 Shelter Rock Lane, Danbury, Conn., has introduced stainless steel wire thread inserts for reducing equipment downtime wherever machine operations are impaired by worn or stripped threads.

The new thread inserts provide greater loading strengths in all materials and are resistant to wear, vibration, seizing, galling and corrosion.

Tapped threads in all types of industrial castings and machine housings may be quickly and economically restored with these inserts, which are available in 47 standard sizes. For special applications, non-standard threads and sizes can also be supplied.

The wire insert operation requires only drilling out the damaged thread, re-tapping the hole slightly oversize with a Heli-Coil tap and winding the wire insert in the newly tapped hole. This produces a permanent thread of the original size.

Because they are manufactured to a diameter slightly larger than the hole and are installed under compression, these spring-like thread inserts are self locking. No amount of vibration or screw tightening will loosen them. However, they can be quickly and easily removed with an extracting tool if this should become necessary.

After the damaged thread is cleaned out and re-tapped, a stainless steel Heli-Coil wire thread insert is quickly installed in the hole with an inserting tool, bringing the hole back to original size. Arrow indicates the repaired hole. These new stainless steel threads, stronger and more durable than original tapped threads, are impervious to stripping, galling, seizing, corrosion and temperature deterioration.

Quick-Detachable Air Connection Unit

L-3 BINKS MANUFACTURING CO., 3122 Carroll Ave., Chicago 12, Ill., has announced a new connection for air hose couplings on paint spray guns and other equipment.

Binks Manufacturing Company reports a pressure drop of only 5% with this new coupling. Connection has full 360 degree swivel action.

Swivel action makes it possible for the spray gun or other tool to be rotated on the base to bring it into position. One short push clicks the connection tightly into place, and air tool and airline instantly become a leak-tight unit. The device is particularly useful in making quick color changes by changing spray guns. Connection is readily broken by a slight downward pull on the sliding collar, without tugging or twisting.

Steam Trap with Integral Strainer

L-4 ARMSTRONG MACHINE WORKS, Three Rivers, Michigan, announces a new cast steel side inlet, side outlet trap with integral strainer.

The mechanism is corrosion resistant stainless steel, identical in design

LOOK-

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and construction to the mechanism used in traps for 900 F, 950 psig duty.

Pressure range is from 0 to 600 psig, maximum capacity is 4400 lb/hr. Connections are ½ in., ¾ in., or 1 in. screwed, flanged or socket weld.

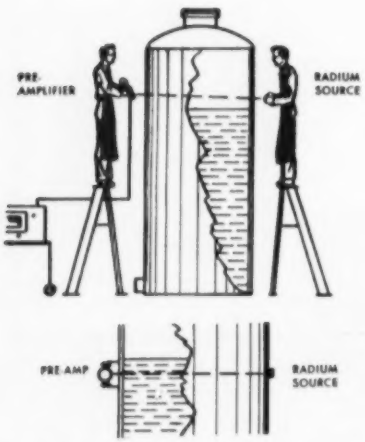
Level Finding Device

L-5 INSTRUMENTS, INC., 122 N. Madison, Tulsa, Okla., is offering a radiation type level finding device available in portable or panel mounted design that may be used without placing any part of the instrument inside the vessel.

The portable model comprises a detector unit weighing less than 6 lb, a shielded source of radiation and a master unit weighing 18 lb.

The radiation source consists of a small amount of radium salt inside a lead shielded container such that radiation can be emitted in one direction only and it is safe for one man to handle this source for eight hours every day. The portable instrument is used to determine the level within a closed vessel or to determine when the level reachs a pre-determined point. The detector unit is placed on one side of the vessel and the source is placed on the opposite side of the vessel at the same height. These two are raised in unison and when the level is reached, a marked increase in radiation is noted on the master unit meter. Thus, it is a simple matter to verify the accuracy of existing permanent level indicators or to find the level inside a vessel where no level indicator is available.

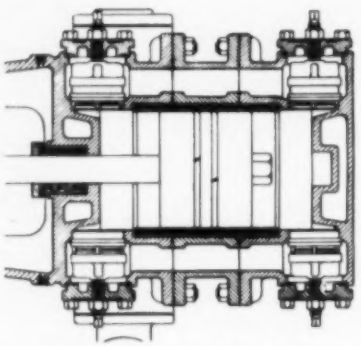
The panel mounted unit is used to determine specific gravity or density of materials in a vessel by measuring the absorption of the gamma rays from the radium salt passing through the material. This unit may also be connected to a recorder for a permanent record.



Portable level finding method for multiple tank installation (above) with the Densitron unit of Instruments, Inc. Lower sketch shows how unit is also applicable to on-off level control or density indication and control.

Compressor Design Has Sectionalized Cylinders

L-6 PENNSYLVANIA PUMP AND COMPRESSOR COMPANY, Easton, Pa., is marketing air and gas compressors with sectionalized cylinders arranged in three pieces and with the inlet and discharge valves in the fronthead and backhead.



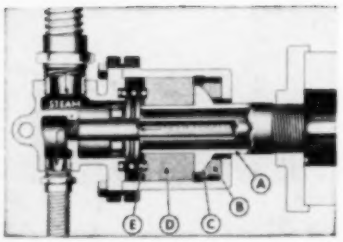
Liner in Pennsylvania's ATH design can be removed without disconnecting inlet or discharge air piping. Available in single stage 100 psig discharge pressure sizes.

The cylinder is readily disassembled, and liner may be removed without disconnecting inlet or discharge air piping, thus facilitating any service problem involving piston rings, piston, or liner. Cooling water passages are accessible for thorough cleaning.

Self-Supporting Joint

L-7 THE JOHNSON CORPORATION, Three Rivers, Mich., has redesigned its Series 2000 Type S self-supporting Johnson Joint for admitting steam or other fluids into the rolls and cylinders of paper, textile, rubber and similar machines.

The joint is designed for use where suitable supports cannot be provided, and where lateral movement is encountered. It shifts as the roll shifts, thereby eliminating dangers of misalignment.

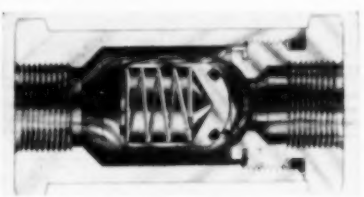


Rotating member of the Johnson Corporation self-supporting joint consists of just one part, the nipple (A) which is attached to roll or cylinder. The nipple has a convex, hemispherical collar (C) which rotates against the matching concave surface of special carbon-graphite seal ring (B). The bearing surface of the nipple, accurately machined, rotates in a carbon-graphite guide (D), which in turn is closely fitted into the body. The spring (E) maintains an initial seating pressure within the joint.

It is completely packless, requires no lubrication, and is self-adjusting to various pressures. Flexible hose is used instead of pipe, to allow the joint to follow movement of the journal. The new series is available in a wide range of threaded nipple sizes, for pressures to 150 and to 250 lb, and for 450 F maximum temperature. Both through flow and siphon type arrangements are offered.

Check Valve Features Low Pressure Drop

L-8 REPUBLIC MANUFACTURING COMPANY, 1930 W. 77th St., Cleveland 2, Ohio, has introduced the new "Free-flow" Check Valve with spherical poppet nose and matching seat which always assure perfect leak-proof seal, because they are self-aligning.



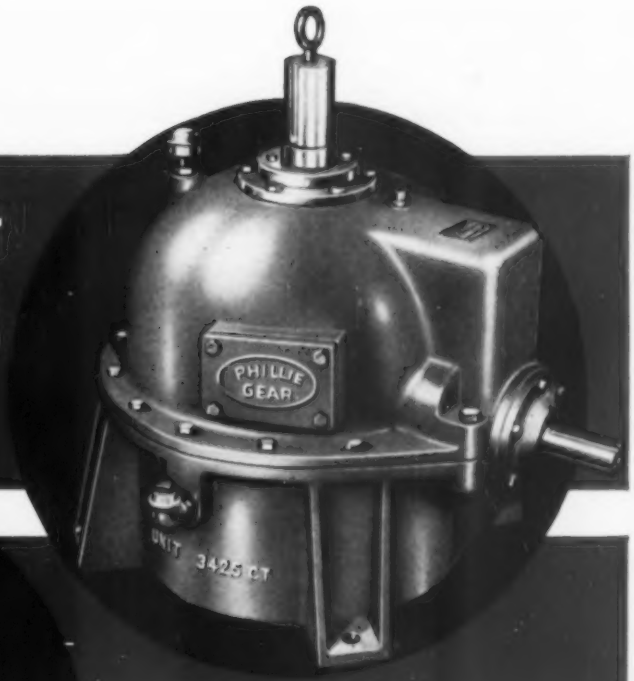
Republic's Free-Flow check valve features low pressure drop, no leakage, high system pressure and small size.

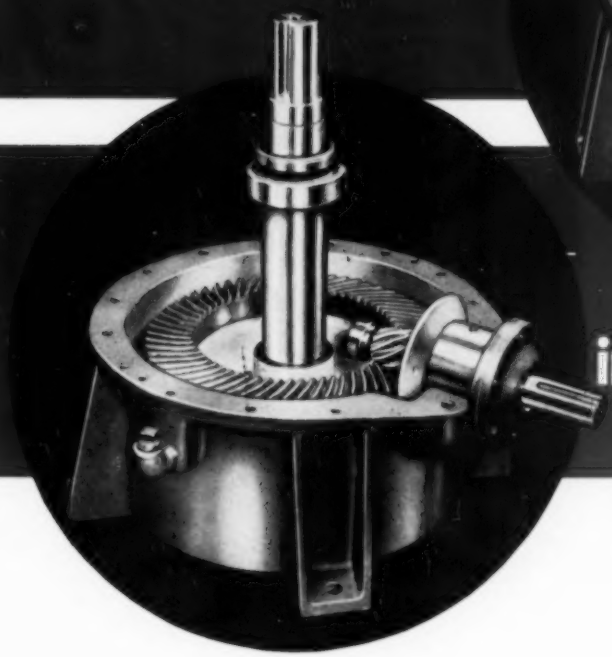
The caged poppet gives "lower than ever" pressure drop, practically no flow restriction, in non-surge hydraulic systems to 3,000 psi. While the standard opening pressure is as low as 3 ounces, stronger springs are available so these units can be used as combination in-line relief-check valves in all combinations of tube and pipe ports, for operating temperatures —65 to 200F; and higher on order.

(Continued on page 120)

NEW...

the latest development by PHILADELPHIA





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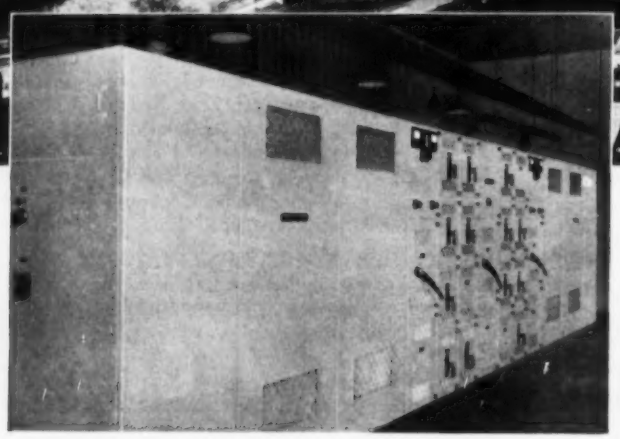
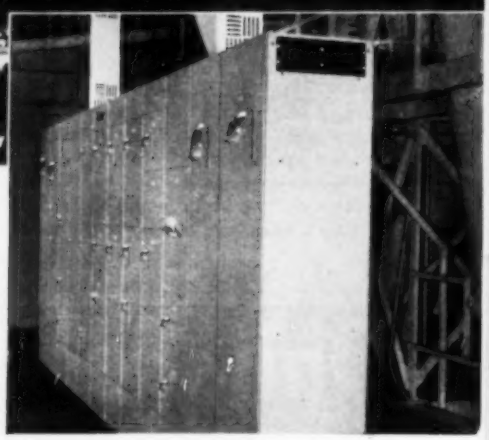
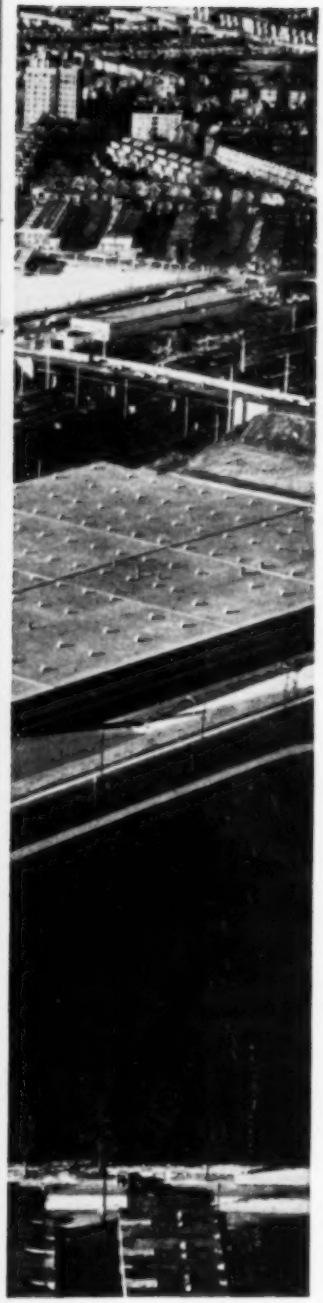


Westinghouse 2000 kva Double-Ended Indoor Power Center is one of three located in the bakery where loads are particularly heavy and concentrated.



Westinghouse Type Control Center is compact . . . centralizes control. Starters are mounted back-to-back to save space in the bakery control room.



Excellent service continuity assured by dual, low-cost power system

An interesting power distribution problem resulted when American Stores Company planned its huge grocery warehouse and automatic bakery at Philadelphia, Pa. There, as a supply center for several hundred retail outlets, vast materials handling and food processing activities would be required. Both demanded highly reliable electrical service, at minimum cost.

Working closely with Ganteaume & McMullen, Engineers-Architects, of Boston, Mass., Westinghouse engineers helped adapt a secondary selective radial distribution system.

In the bakery, where continuous operation is exceedingly vital, the system supplies each load center over two primary feeders and through duplicate transformers. Thus, failure of one feeder cable or transformer permits immediate transfer of load to another feeder and transformer. Excellent service continuity is assured.

A lesser degree of continuity is required in the warehouse. Here, a bus tie feeder is located between two substations. It permits a limited amount of power to be made available to the other switchgear should one substation fail.

Westinghouse unitized equipment helped reduce power distribution costs. Use of five Westinghouse Power Centers enabled American Stores to bring high voltage close to the loads. Lower copper losses and minimum voltage drop resulted. Too, short secondary runs saved a considerable amount of copper. Improved voltage at the load was assured; losses were minimized.

Whether you are involved in a new construction project or plant modernization program, Westinghouse offers you the same assistance. Our engineers are ready to help you and your engineers plan a modern distribution system . . . and match it with a complete line of well engineered equipment.

For full details, call your nearest Westinghouse Office. Or write direct to Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania.

J-94007

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HERE'S A STORY EVERY PLANT OPERATING MAN SHOULD READ

"Heating in our main switch was causing Shutdowns But we stopped them cold by changing to Fusetron dual Element Fuses"

"In the Fall of 1951 in our cafeteria, we installed a new 1200 ampere switch. This switch controlled the lighting, refrigeration and a 115 ton air conditioning load.

"Everything was fine until the temperature reached 85 degrees and the summer air conditioning load came on. Then we had trouble.

"Three times in May, 1952 during our noon rush our whole place was shutdown.

"Our dining rooms seat 500 people at a time, so you can see what a shutdown during the noon rush means to us.

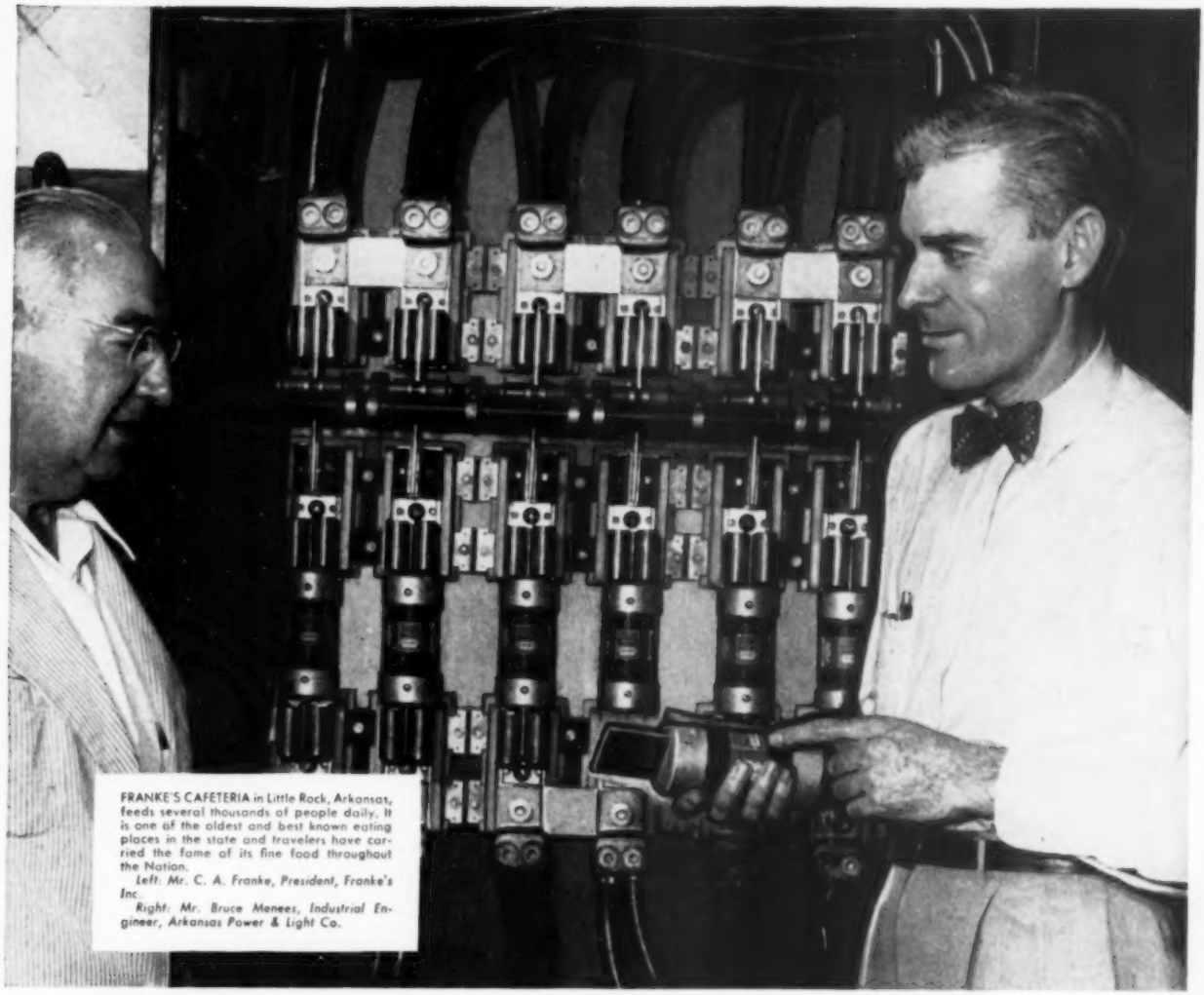
"We were fighting mad about the whole affair as the installation was practically new. Mr. Menees of the Arkansas Power and Light Co. was called in.

"He suggested that the trouble was due to the adding of the summer temperature to the normal heating of the fuses. Then he recommended that we discard our ordinary fuses and install FUSETRON dual-element fuses, as these modern fuses operated at a much cooler temperature than other fuses.

"This we did. To date, June 19, 1953, over one year since we made the change we have not had a shutdown due to a fuse blowing even though today's temperature outside is over 100 degrees.

"The cooler operation of FUSETRON fuses stopped shutdowns cold for us."

C. A. Franke, President
Franke's Inc., Little Rock, Ark.



FRANKE'S CAFETERIA in Little Rock, Arkansas, feeds several thousands of people daily. It is one of the oldest and best known eating places in the state and travelers have carried the fame of its fine food throughout the Nation.

Left: Mr. C. A. Franke, President, Franke's Inc.

Right: Mr. Bruce Menees, Industrial Engineer, Arkansas Power & Light Co.

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1 *Protect against short-circuits.

2 Protect against needless blows caused by harmless overloads.

3 Protect against needless blows caused by excessive heating—lesser resistance results in cooler operation.

4 Provide thermal protection—for panels and switches against damage from heating due to poor contact.

5 Protect motors against burnout from overloading.

6 Protect motors against burnout due to single phasing.

7 Give DOUBLE burnout protection to large motors — without extra cost.

8 Make protection of small motors simple and inexpensive.

9 Protect against waste of space and money — permit use of proper size switches and panels.

10 Protect coils, transformers and solenoids against burnout.

*Fusetron Fuses have high interrupting capacity as shown by tests of the Electrical Testing Laboratories of New York.

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Continued on page 135

12-53-2

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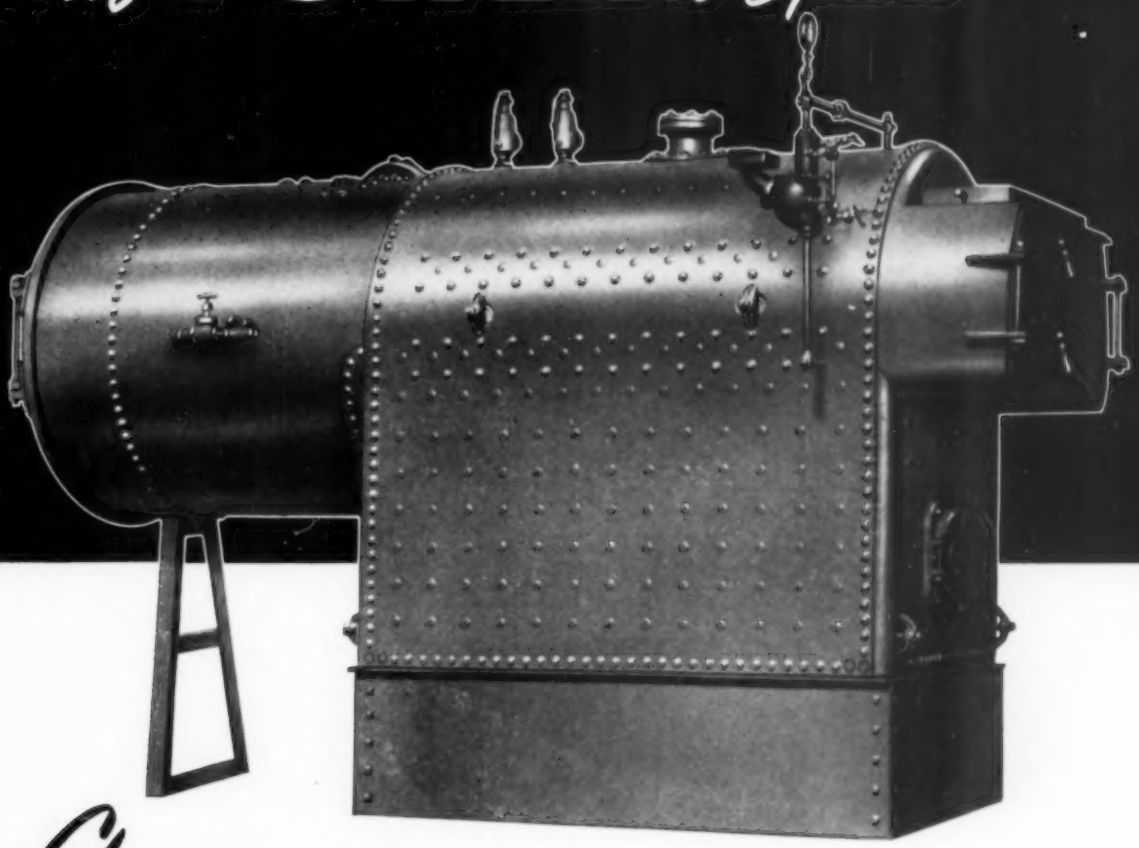

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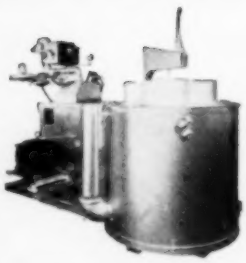

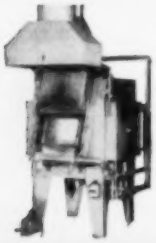

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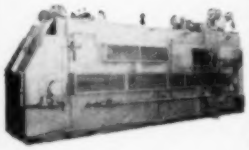

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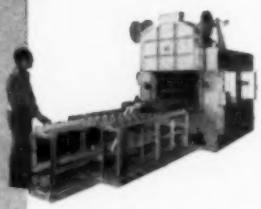

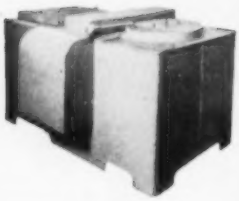

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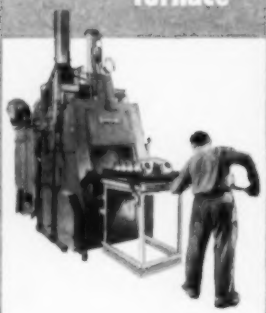
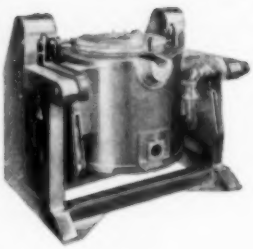


Fisher melting and holding furnace (gas or oil fired)



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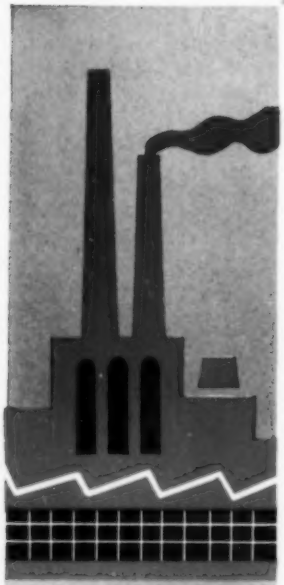

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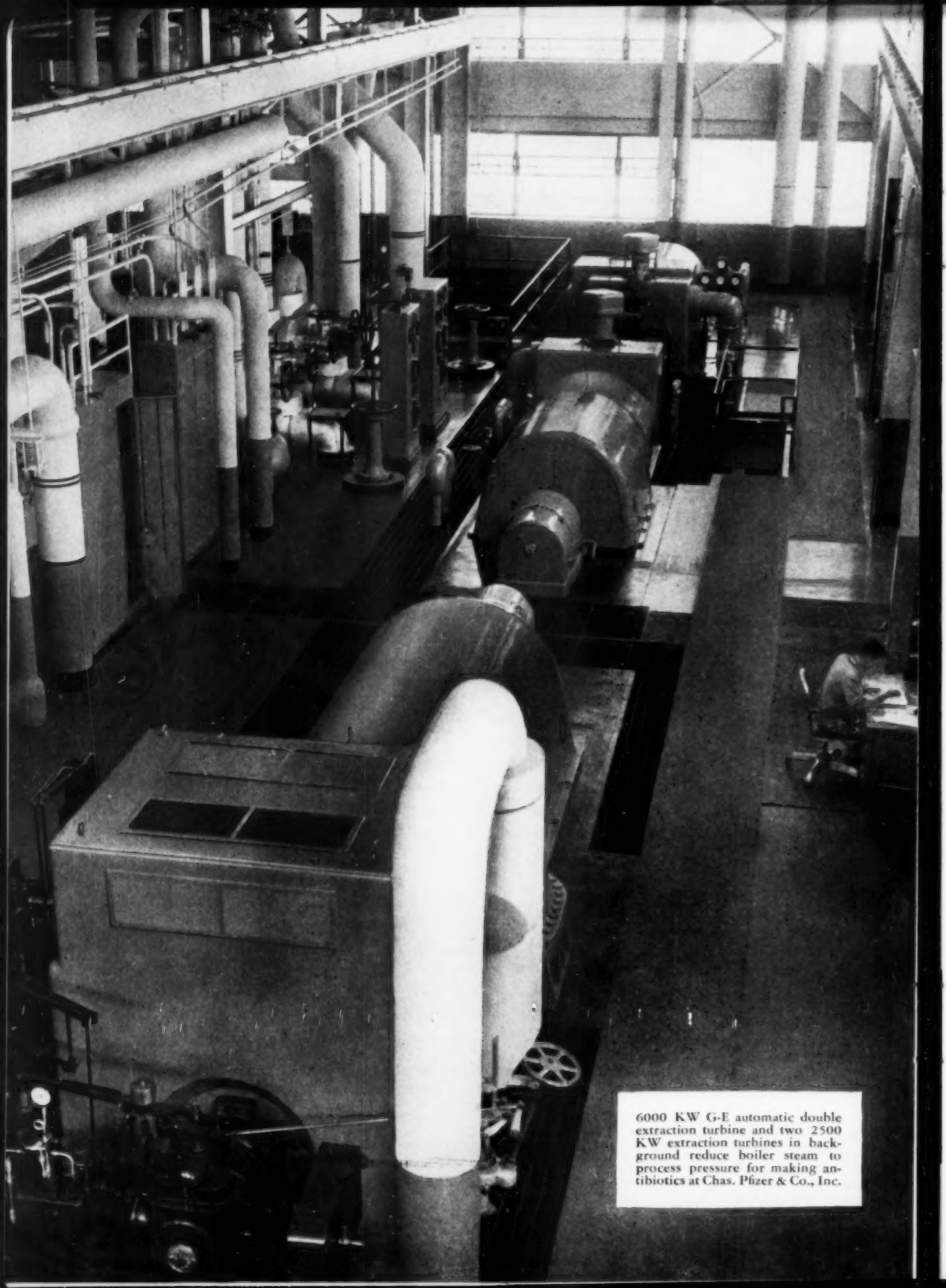

6000 KW G-E automatic double extraction turbine and two 2500 KW extraction turbines in background reduce boiler steam to process pressure for making antibiotics at Chas. Pfizer & Co., Inc.

G-E Extraction Turbine at Chas. Pfizer & Co., Inc. Increases Plant Thermal Efficiency Over 15%

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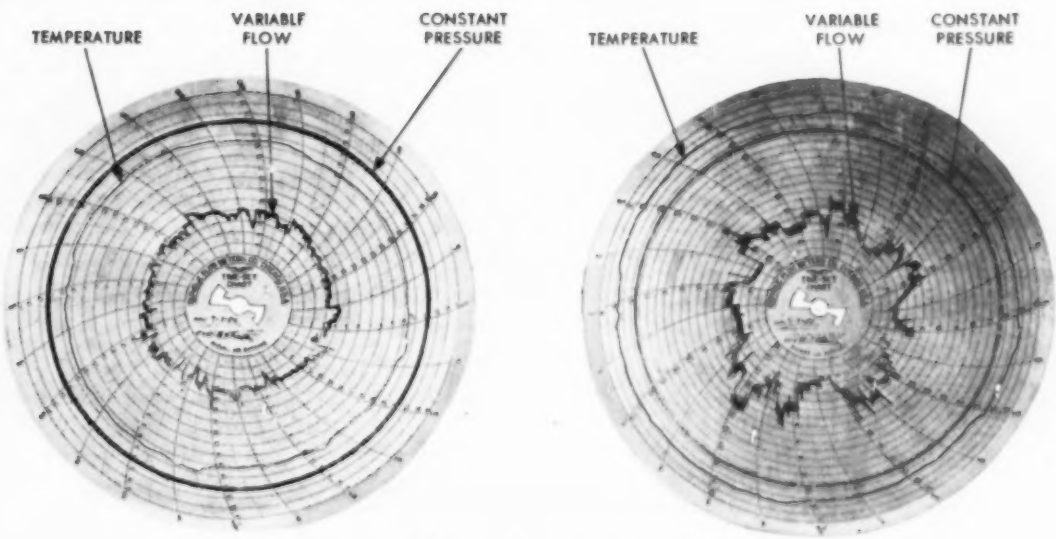

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Vertical adjustment up to 2½ inches can be made.

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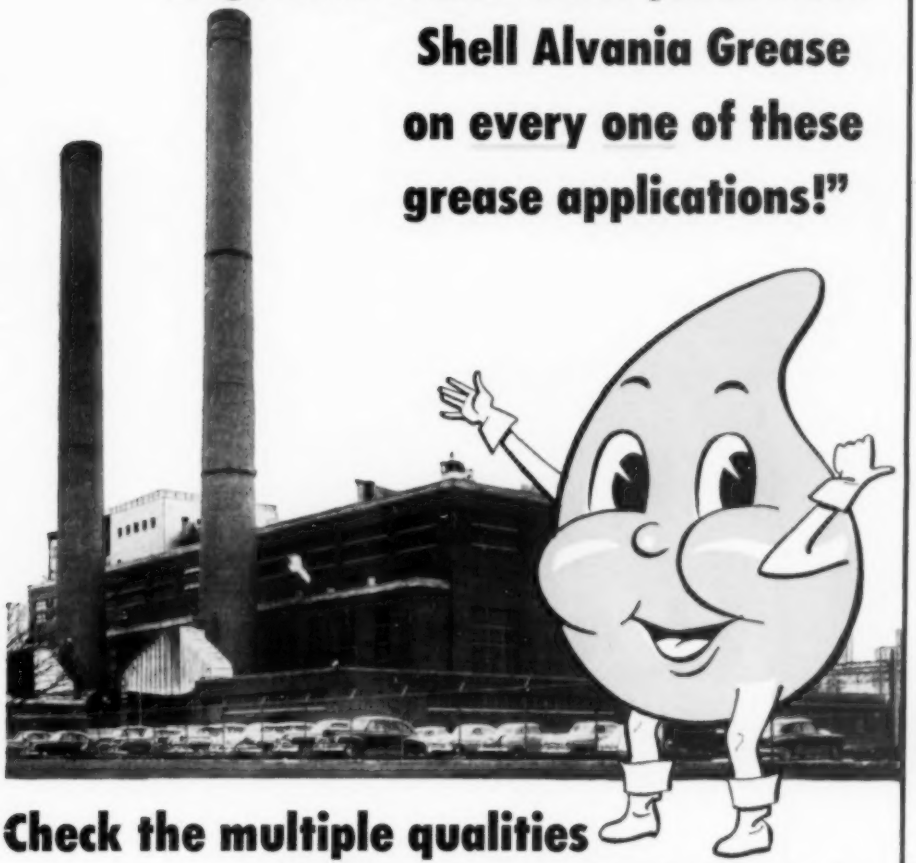

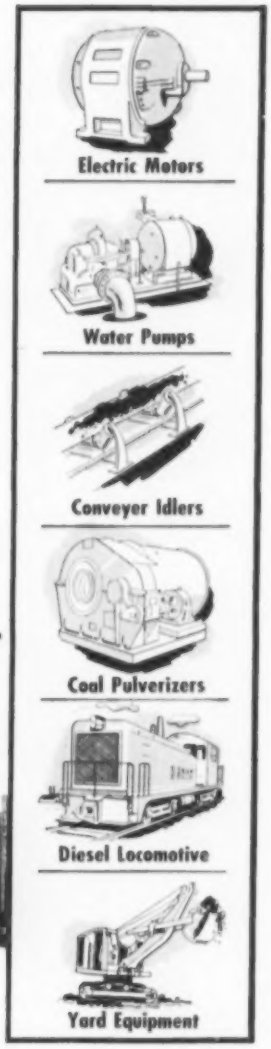

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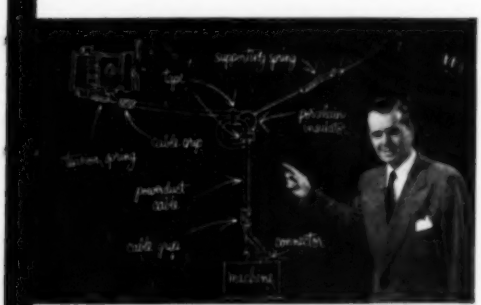

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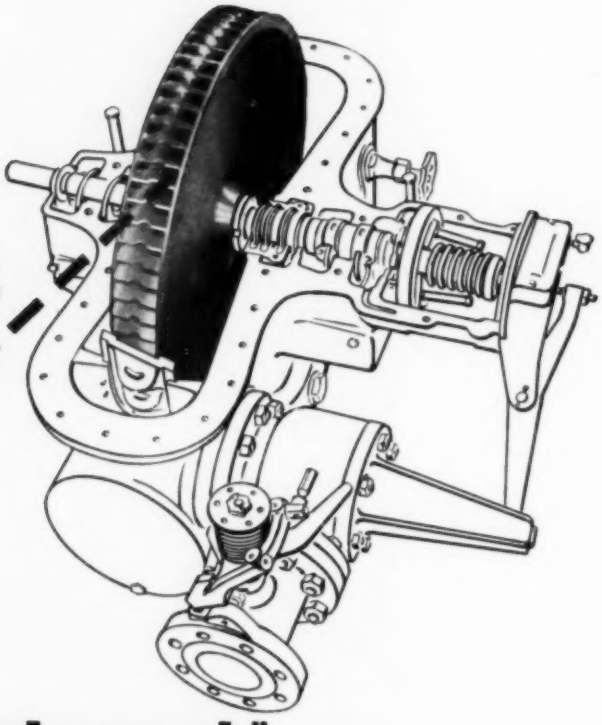

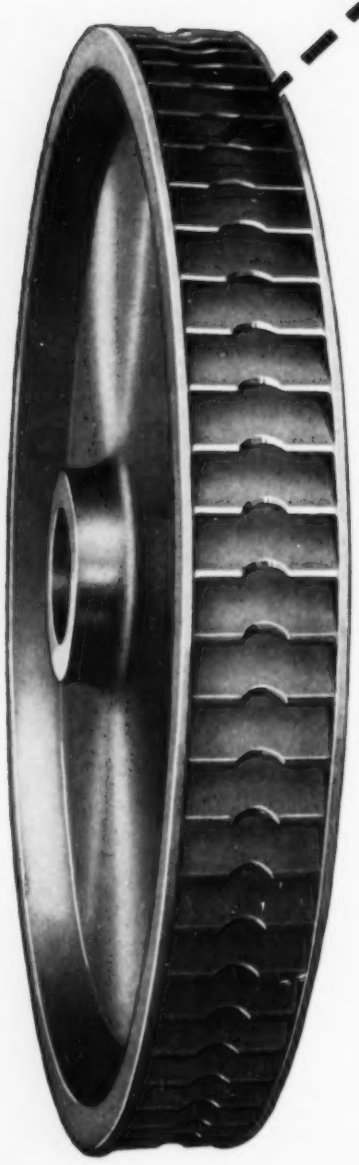

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These are only a few of the reasons why the Terry solid wheel has become a "Trade Mark" for trouble-free turbine performance. For complete details, send for a copy of bulletin S-116. No cost or obligation.

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Edward Fig. 444-448 series, built in sizes ¼ to 2 in. inclusive . . . forged steel globe and angle . . . 600 and 1500 lb sp . . . bolted or union bonnet . . . screwed or socket welding ends . . . Fig. 448 illustrated.

CHECK THESE Big 1 FEATURES

- ✓ Hard bronze yoke bushing to prevent stem seizing or galling . . . lock welded to yoke
- ✓ Packing is Edward EValpak . . . heat resistant, water-proofed and die molded for long service
- ✓ Disk of EValloy 13% chromium or Stellite . . . slotted or disk nut type . . . self centering
- ✓ Tight, easily accessible bolted or union bonnet joint . . . with Ironkote gasket of 90 Brinnel max. hardness for leak-proof joint
- ✓ Heat treated forged steel inclined stem globe type body for lowest pressure loss
- ✓ Built-in pressure-tight backseat . . . permits repacking under pressure
- ✓ Roomy forged yoke . . . plenty of finger space for repacking
- ✓ Strong forged gland bolts . . . plated for long thread life

Edward Valves, Inc.
122 West 144th Street, East Chicago, Indiana

Please send literature covering your Fig. 444-8 series all-purpose forged steel valves.

Name_____

Company_____

Position_____

Address_____

City_____ Zone____ State_____

Edward Valves, Inc.

Subsidiary of ROCKWELL MANUFACTURING COMPANY

EAST CHICAGO, INDIANA

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Protected Type Motors

solve tough production problems

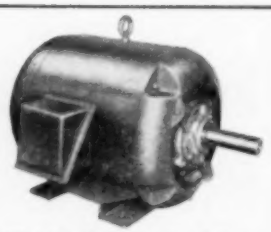
Do you need motors to operate under severe conditions? If you do—you can solve your problem easily with Wagner's complete line of protected type motors.

They are specifically designed for use wherever EXTRA protection is demanded —for bearings or windings . . . against corrosive vapors or abrasive dusts . . . in explosive atmospheres or in exposed outdoor locations.

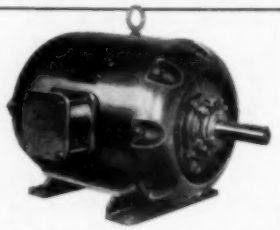
In their specific applications, each of these Wagner Motors assures complete protection of vital parts. Wagner Motors are backed by more than sixty years of motor building experience.

* * *

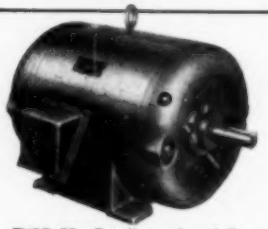
A Wagner engineer will be glad to help you select the correct motor for *your* specific application. Consult the nearest of our 32 branch offices, or write for Bulletin MU-185 for complete information.



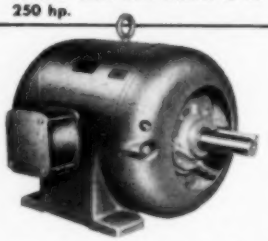
TYPE CP—Totally-enclosed Fan-cooled. Steel frame. 1 to 250 hp.



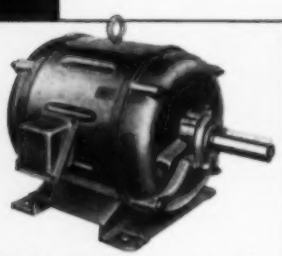
TYPE HP—Explosion-proof. Steel frame. 1 to 250 hp.



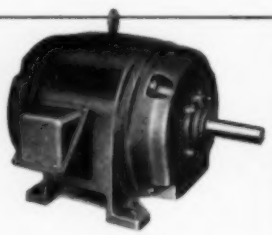
TYPE EP—Totally-enclosed Fan-cooled. Cast iron frame. 2 to 250 hp.



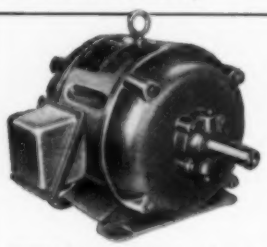
TYPE JP—Explosion-proof. Cast iron frame. 2 to 250 hp.



TYPE RP—Drip-proof. Steel frame. ½ to 400 hp.



TYPE XP—Splash-proof. Cast iron frame. ¾ to 200 hp.



TYPE TP—Totally-enclosed, non-ventilated. ¼ to 15 hp.

® Wagner Electric Corporation EST. 1891

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ELECTRIC MOTORS • TRANSFORMERS • INDUSTRIAL BRAKES
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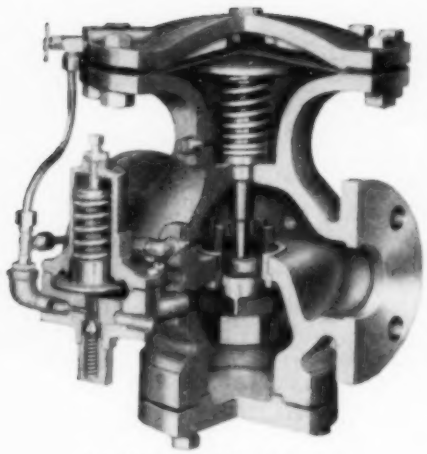
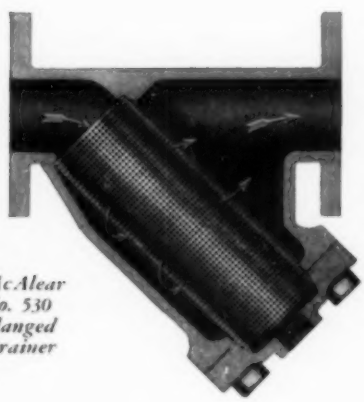
KNOW THE VALUE OF EXPERIENCE AND ENGINEERING "KNOW-HOW"



McAlear 228 Pilot-Operated Pressure Reducing Valve

Behind each unit of McAlear control equipment is a half-century of specialized engineering experience reflected in an enviable reputation of dependable service!

The No. 228 Pilot-Operated Pressure Reducing Valve (left) is accurately sensitive and dependable where positive and automatic control of reduced pressure is required in steam service.



McAlear No. 530 Flanged Strainer

McAlear strainers are recommended for all control valves, regulators, automatic trap installations and other uses where grit and scale are present. They are furnished for any purpose . . . "Y" and basket type construction . . . ½ to 24 inch size range.

Write today for our bulletin No. 228 and No. 128A covering the Pilot Operated Pressure Reducing Valve and McAlear Strainers

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1901-1923 SOUTH WESTERN AVE.
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PRESSURE · FLOW · LIQUID LEVEL · TEMPERATURE
controls
for STEAM, WATER, AIR, OIL and GAS

TOTAL ENGINEERING

The reclaiming of coal from power plant's storage area is facilitated by Link-Belt belt conveyor system. Fed by Link-Belt apron conveyor, 30-in. wide belt conveyor discharges coal in crusher house.

It's your assurance of top efficiency with LINK-BELT belt conveyors

HERE'S how "total engineering" works for you when you use Link-Belt Belt Conveyors. First, Link-Belt conveyor engineers analyze your needs—then recommend the *right* components. In addition, Link-Belt can supply all related equipment — other types of conveyors, feeders, elevators, car dumpers and shakers. And Link-Belt will build your supporting structures and enclosures . . . install the job completely, if desired. Call the Link-Belt office near you for any engineering assistance you need.

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BELT CONVEYOR EQUIPMENT 13.280-B

LINK-BELT COMPANY: Plants: Chicago, Indianapolis, Philadelphia, Colmar, Pa., Atlanta, Houston, Minneapolis, San Francisco, Los Angeles, Seattle, Toronto, Springs (South Africa), Sydney (Australia). Sales offices in Principal Cities.

LINK-BELT builds a complete line of belt conveyor components

ALL TYPES OF ROLLER BEARING IDLERS

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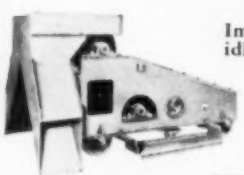
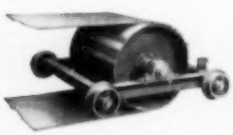
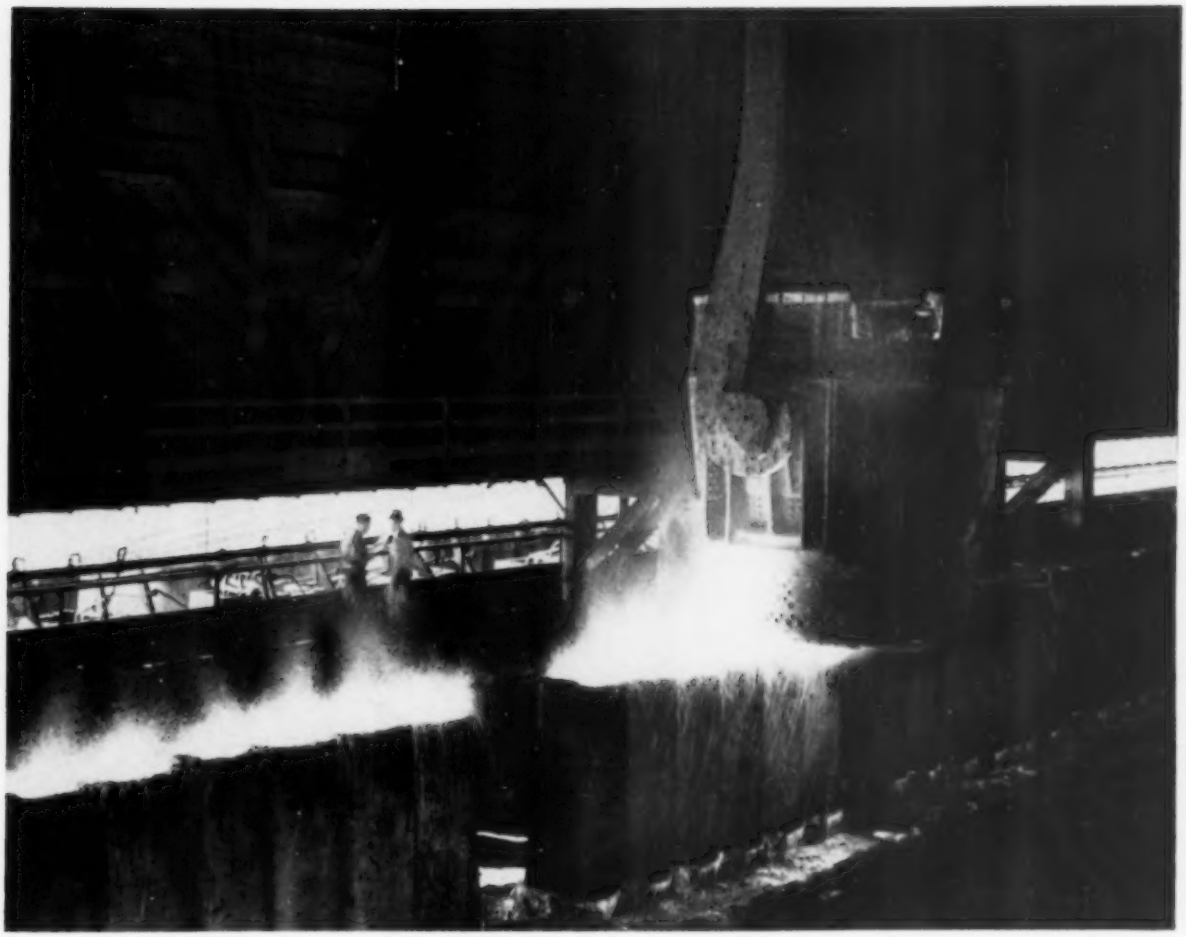


BELT AND MOTOR PROPELLED TRIPPERS

COMPLETE TERMINAL MACHINERY





The Eyes of Taxes Are Upon You

PRESENT DAY TAXES and production costs, plus the competitive conditions existing in industry today, make production *economies,* or *increased* production, almost essential . . . Correct lubrication can play a major part in *both!* The *exactly-right* lubricant for each machine will effect production economies by reducing power consumption, machinery wear (and subsequent replacements), and maintenance costs . . . On the increased production side, correct lubricants can be of vital assistance in enabling machinery to operate faster and longer, and reducing "downtime" by extending the time between scheduled overhauls . . . Your Standard Oil representative is qualified, by training and long experience, to assist you in the selection of *correct* lubricants. He knows a lot more about lubricants than just the selling of them. Why not call him in?

Standard Oil Company
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STANDARD OIL
LUBRICANTS

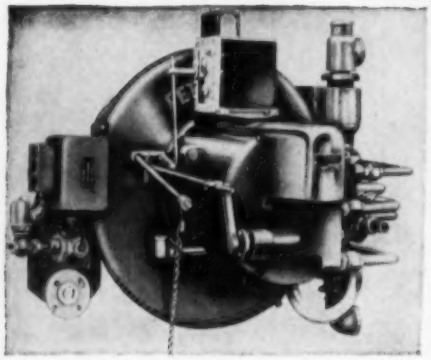
NO MATTER WHAT THE DEMAND

THERE'S A

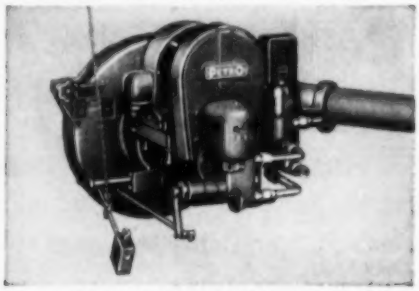
Petro

INDUSTRIAL OIL BURNER

to handle it!



Shown above Model WA for use with cold oil.
Also available Model W-AH for use with heated oil.



Model G-W Combination oil-gas.

Cut Fuel Costs with Heavy Fuel Oil

Petro rotary oil burners are built for firing all types of boilers up to 600 boiler horsepower, and also for many other industrial applications. They are designed to burn the low-cost, heavy fuel oils with complete reliability, Petro oil burners slash fuel costs two ways—they burn the *lower priced oils*, and they do it with *outstanding efficiency*. Fluctuating steam demands are answered automatically with Petro modulating flame control. Thousands of owners will tell you that Petro Industrial Oil Burners and combination oil-gas burners are fuel savers, labor savers and trouble savers, and their dependability is traditional.

Your heating contractor can tell you about Petro burners. Turn to "Oil Burners" in telephone book yellow pages. See catalog in Sweet's Architectural File, or mail coupon below.

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INDUSTRIAL AND COMMERCIAL OIL, GAS AND COMBINATION OIL-GAS BURNERS, RESIDENTIAL OIL BURNERS, OIL AND GAS FURNACES AND BOILERS

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Please send me the Petro catalog of commercial-industrial oil and gas-oil firing equipment.

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Public Service Company of Colorado
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Southern Indiana Gas & Electric Company
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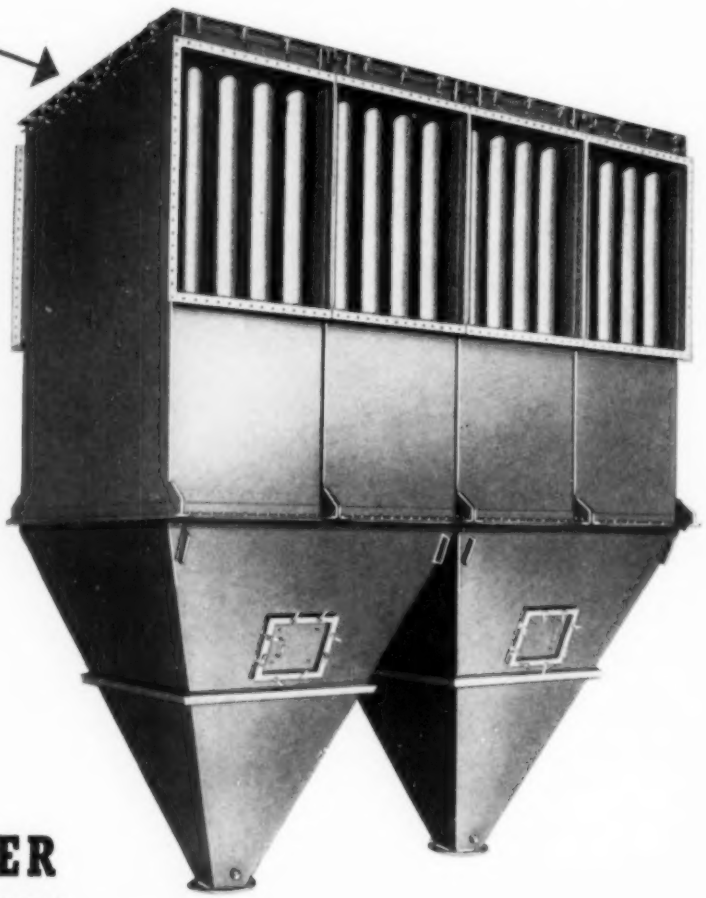
American Blower . . . a time-honored name in air handling

This filter collects the residue from a burning cigarette

This American Blower Fly Ash Precipitator collects fly ash from boilers burning solid fuels.



Install an American Blower Fly Ash Precipitator in your power plant— and see the difference.

AMERICAN BLOWER

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HALL INDUSTRIAL WATER REPORT

Hall Laboratories, Inc.—A Subsidiary of Hagan Corporation, Pittsburgh, Pa.

Volume 1 | DECEMBER 1953 | Number 6

Zeolite Double Trouble Solved

A utility plant has solved a bothersome two-way problem with their base exchange water softeners. Suspended matter periodically fouled up the beds so that even after regeneration the exchangers functioned at low efficiency. In addition, tanks were corroded by the brine solution used for regeneration.

These problems were presented to the Hall field engineer in the area, and were licked when he prescribed Banox.* Both difficulties were taken care of by Banox, since it has an inhibiting action on brine corrosion, and its high activity as a dispersing agent assured clean beds each time the units were regenerated.

Other problems involving "dirty" exchangers can be solved once the facts are ascertained. Different solutions may be required, for example sterilization of the bed in a case of slime accumulation.

Paper Presented at Water Conference

B. Q. Welder, Hall engineer, presented a paper on "Gadgets" at the final session of the Fourteenth Annual Water Conference of the Engineers Society of Western Pennsylvania held in Pittsburgh on October 19, 20, 21. Co-authored by Dr. E. P. Partridge, Director of Hall Laboratories, the paper reports field observation of the performance of various devices claimed to be effective in treating water by non-chemical means. Reprints of the paper will be available after the "Proceedings of the Fourteenth Annual Water Conference" has been published.

*Banox is a registered trademark.

Stream Polution Survey Cuts Waste Disposal Costs

In order to comply with state standards, a metal-plating plant in the midwest was contemplating the construction of a waste water installation with a capacity of 1,500,000 gpd.

A detailed study of the processes employed in the plant, conducted by Hall engineers in close co-operation with plant personnel, resulted in recommendations leading to a drastic reduction in the amount of waste requiring treatment. The practical outcome—a waste water treatment plant is being built with a capacity of only 250,000 gpd, now adequate for all requirements. Additional benefits are being realized through more efficient operation and the recovery and reuse of plating materials.

The solution of the problem of waste water disposal began with a study of process water use and the development of methods for its conservation and reuse. Since this plant had time to act before the state authorities put the pressure on, a complete study was made to supply an economical and effective result.

Technical Information Program Covers 20 Years

Keeping clients informed is one of the continuing services of Hall Laboratories. During the past twenty years, reprints of nearly one hundred technical articles, papers and discussions have been sent to Hall clients all over the world. These reprints covered the latest developments in water treatment and allied fields, and ranged in subject matter from "Gaging and Sampling Water-Borne Industrial Wastes" to "Concentrating Films: Their Role in Boiler Scale and Corrosion Problems."

Some papers have been of such general interest that requests have come from many plants, not clients of Hall Laboratories, both in this country and abroad. For example requests for the paper on "Concentrating Films" have come from Canada, Venezuela, Argentina, England, Holland, India, Formosa, and the Philippines.

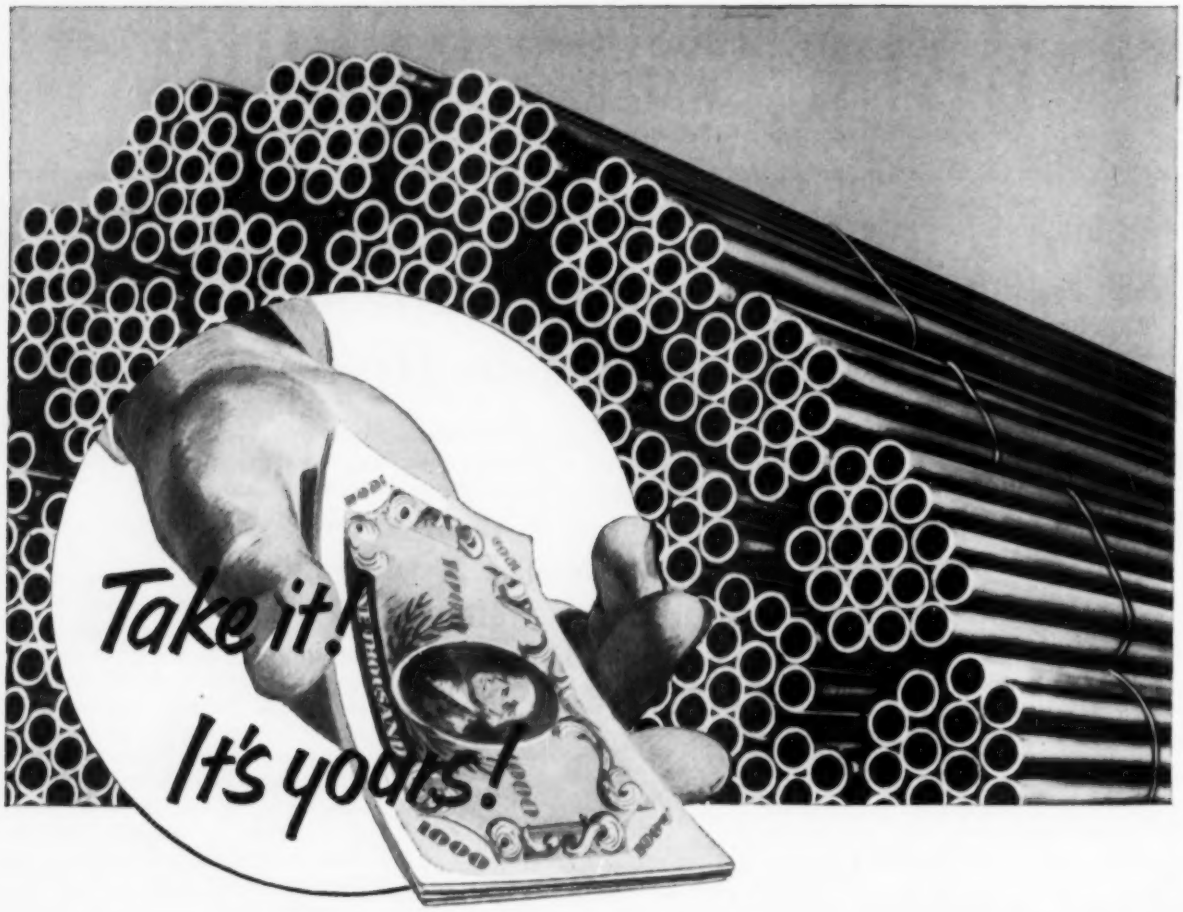
Industrial Water Problems Require Special Handling

There are no "stock answers" to industrial water problems. For information, write, wire or call Hall Laboratories, Inc., Hagan Building, Pittsburgh 30, Pa.

Water is your industry's most important raw material. Don't waste it.

ASME Meeting in New York

Among papers to be presented at the 74th annual meeting of the ASME in New York are several sponsored by the Joint Research Committee on Boiler Feedwater Studies. Included is the paper, "Action of Boiler Water on Steel—Attack by Bonded Oxygen" by Kaufman, Trautman and Schnarrenberger of Hall Laboratories. Other papers cover corrosion by dissolved oxygen and the breakdown of amines in boiler water.



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YOU'VE earned thousands of dollars in savings by using the right tubing for your particular installation. And you got the right tubing when you called on NATIONAL before you bought.

We've been in the tubing business for over sixty years. In fact we're the world's largest manufacturer of tubular steel products. It's pretty obvious, then, that over the years we've had a chance to analyze thousands of tubing installations. We've run up against just about every tubing problem in the book, and we've kept records of our findings. We call these records our "experience file." Our recommendations from this file are available to you at any time—at no cost. And they may save you thousands of dollars.

If you are having trouble with corrosion, high pressures, heat or exposure, give us a chance to help you the next time you're ready to order tubing. Your problem may be a new one to you, but there's a pretty good possibility that we've encountered it before and have the answer to it. So consult NATIONAL first. Bring your tubing problems *home*—to "Tubing Headquarters." For complete information, write to National Tube Division, United States Steel Corporation, 525 William Penn Place, Pittsburgh 30, Pennsylvania.

NATIONAL TUBE DIVISION, UNITED STATES STEEL CORPORATION, PITTSBURGH, PA.
(Tubing Specialties)
COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO, PACIFIC COAST DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

U·S·S NATIONAL *Seamless* PIPE AND TUBES

UNITED STATES STEEL

Deaerating Heaters

BY WEIGHT? OR BY DESIGN?

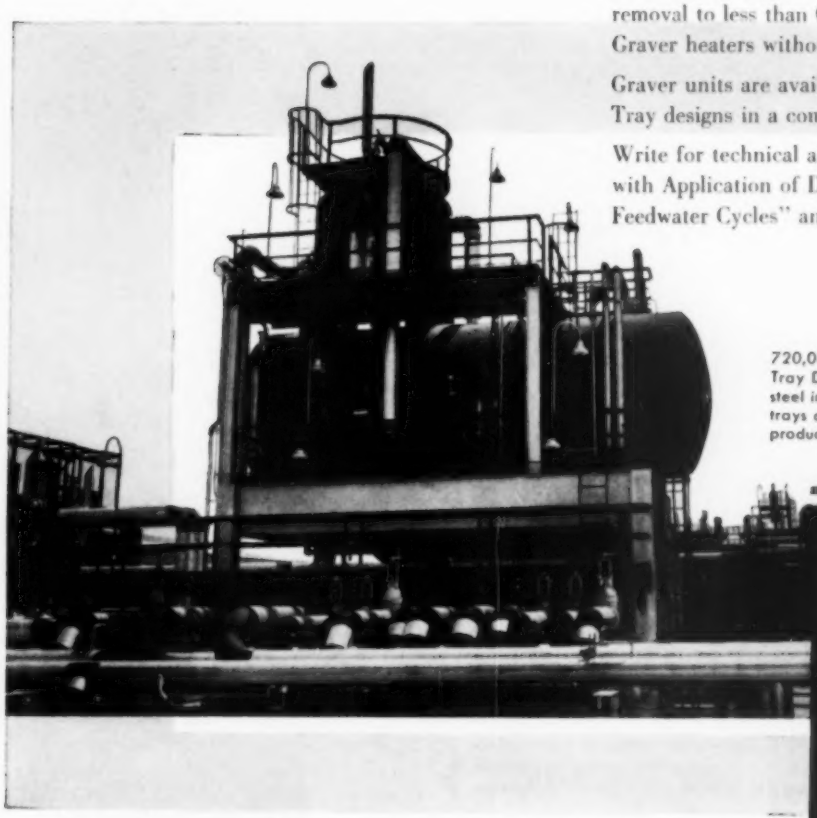
Forty-five years ago, deaerating heaters were built of cast iron trays and outer shells. Cast iron was corrosion resistant, but was also heavy and cumbersome.

Today, Graver's effective design has eliminated the need for this excessive weight. Yet, Graver Deaerating Heaters are corrosion resistant and structurally strong. *Stainless steel* is used for all internal parts in contact with corrosive water or atmosphere as well as for internal vent condenser, trays and trim. All other parts of the vessel are constructed of high grade carbon steel.

Furthermore, although the weight of Graver Deaerating Heaters has decreased over the years, the efficiency in oxygen removal has increased. Oxygen removal to less than 0.005 ml/liter is obtained in Graver heaters without difficulty.

Graver units are available in Spray, Tray, and Spray-Tray designs in a complete range of sizes.

Write for technical article, "Experiences with Application of Deaerating Heaters in Feedwater Cycles" and bulletins.



720,000 lb. per hr. Graver Spray-Tray Deaerating Heater with stainless steel internal vent condenser and trays at a southwestern metal-producing plant.

Graver stainless steel tray

GRAVER WATER CONDITIONING COMPANY

Division of Graver Tank & Mfg. Co., Inc.

Dept. SPI-H, 216 WEST 14th STREET, NEW YORK 11, N. Y.

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GRAVER *Deaerating Heaters*

EQUIPMENT FOR ALL WATER AND WASTE TREATMENT PROCESSES

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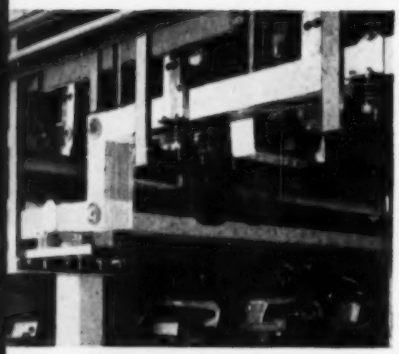
From Incoming POWER to Operating POWER

Complete Electrical Distribution Equipment for Electrochemical and Electrothermal Industries

Four cooperating I-T-E Divisions provide unified, coordinated service. One order; one responsibility; simplified planning; easiest installation.

R&IE EQUIPMENT



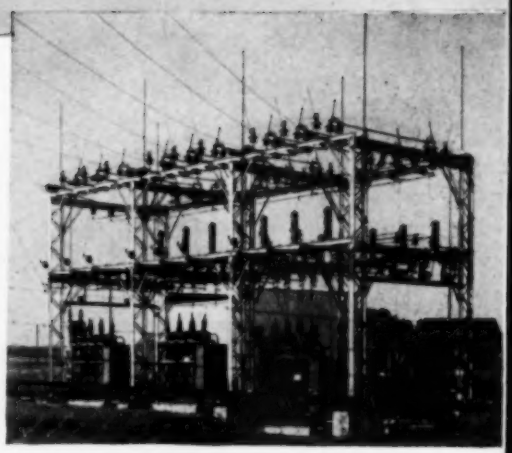
For incoming power—SWITCHING EQUIPMENT and SUPPORTING STRUCTURES. Complete design and fabrication for bus supports, air switches, cutouts, and supporting structure.

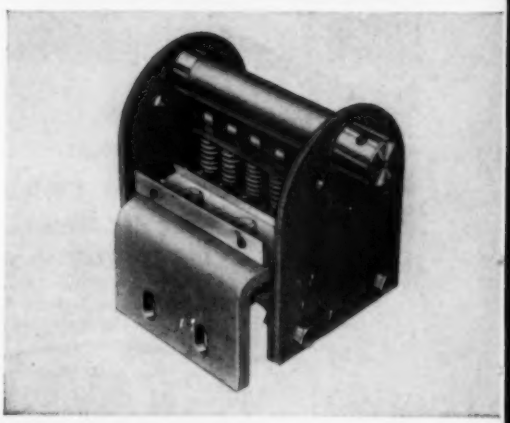
For power feed to cells or furnaces—BUS DESIGN and FABRICATION. Engineering service, detailing, and complete fabrication. Ready to install.

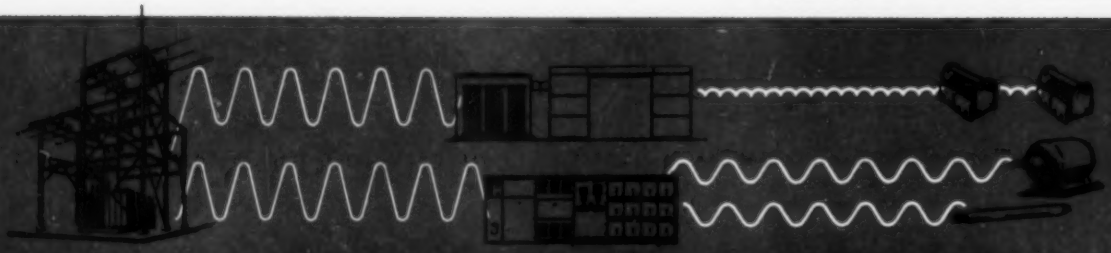
For shorting cells or other equipment—HIGH-CURRENT DISCONNECTING SWITCHES. Economical, space-saving switch applications for chemical or thermal processes.

For protection of men and equipment—KIRK KEY INTERLOCK SYSTEMS. Prevent the authorized operator from performing an unauthorized operation.

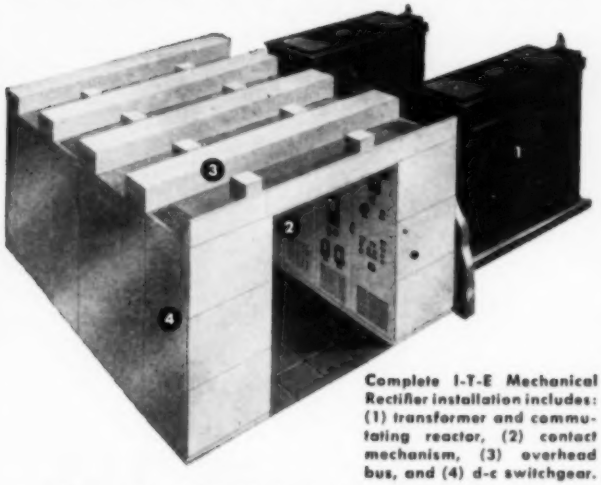
Call the nearest I-T-E Field Engineer for complete service with Power Distribution and Power Switching Equipment.







MECHANICAL RECTIFIERS



Complete I-T-E Mechanical Rectifier installation includes: (1) transformer and commutating reactor, (2) contact mechanism, (3) overhead bus, and (4) d-c switchgear.

For d-c supply—I-T-E Mechanical Rectifiers have operating efficiency of 94% to 97%, including all components from a-c line to d-c bus. High efficiency is maintained from 25% to 125% of rated load current.

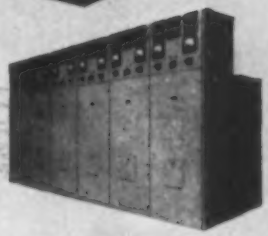
These rectifiers are an excellent source of savings on power costs. Their design saves space. Installation is simple. No special building construction or cranes are required.

5,000-ampere contact mechanism. Multiple 5,000 and 10,000 ampere mechanisms are operable in parallel.

SWITCHGEAR

Unit Substations

For applications requiring primary or secondary types; indoor or outdoor installation; oil, askarel, or air transformers. Switchgear is of I-T-E metal-enclosed construction with drawout-mounted air circuit breakers.

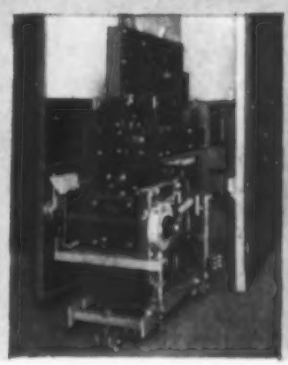


Metal-Clad Switchgear

For reliable protection, based on proved interrupting capacity, I-T-E provides factory-assembled and -tested switchgear, shipped as a unit, ready for low-cost installation. I-T-E air circuit breakers are horizontal-drawout mounted, featuring simplified disconnect and test with doors closed.

Low-Voltage Switchgear

For reliability and long life with reduced maintenance, I-T-E has metal-enclosed switchgear featuring pantograph, drawout air circuit breakers with complete range of ratings and widest selection of protective devices. Structures are exceptionally rugged and durably finished.



D-C Circuit Breakers

For interrupting heavy direct currents, as for protection of rotating machines and rectifiers, I-T-E provides specially-developed circuit breakers combining very rugged construction with fast circuit-opening and reliable arc extinction. Available auxiliary devices make these circuit breakers widely applicable.

Pullbox-mounted Urelite with all live parts enclosed for safety and dependable performance.

AIR CIRCUIT BREAKERS

LARGE and SMALL

For low-voltage applications, I-T-E offers a wide range of frame sizes, ratings, and tripping arrangements. Individually enclosed large air circuit breakers (Urelites) have the widest selection of trip devices and accessories. Molded case circuit breakers, available in four frame sizes, have dust-tight, vapor-tight, moisture-proof, or explosion-proof enclosures. All breakers are designed for easy application, accessibility, and trouble-free operation.

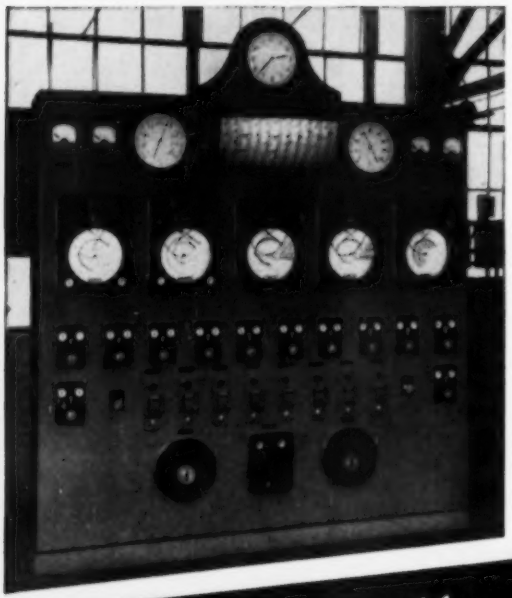
Molded Case Circuit Breaker in approved explosion-proof enclosure.

I-T-E CIRCUIT BREAKER COMPANY

Power Switching and Distribution Equipment

Circuit Breaker, Switchgear, and Rectifier Divisions, Philadelphia 30, Pa.

R&IE Equipment Division, Greensburg, Pa.



This Bailey Boiler Control Panel in a mid-western industrial plant saves fuel and insures safe operation of a 100,000 lb per hr, 175 psi, sat., pulverized coal and gas-fired boiler.

What's Your Control-Dollar Efficiency?

Control-dollars frequently bring annual investment returns of 100% or more. When you buy adequate, well-applied steam plant controls, you increase your dollars' ability to work usefully for you.

That's where Bailey can help: Bailey Controls can give you a better control-dollar efficiency. Here's why:

1. **Complete Range of Equipment—fully co-ordinated.** You need never worry that a Bailey Engineer's recommendation is slanted in favor of a particular type of equipment, just because he has a limited line to sell—or that Bailey will pass the buck for efficient control; we offer *complete* boiler control systems.

2. **Engineering Service—backed by experience.** No other manufacturer of instruments and controls can offer as broad an experience, based on successful installations involving all types of combustion, flow measurement and automatic control.

3. **Direct Sales-Service — conveniently located near you.** Bailey Meter Company's sales-service engineers are located in more industrial centers than those of any other manufacturer of boiler control systems; you get prompt, experienced service with a minimum of travel time and expense.

•

For better control-dollar efficiency—for more power per fuel dollar, less outage and safer working conditions, you owe it to yourself to investigate Bailey Controls. Ask a Bailey Engineer to arrange a visit to a nearby Bailey installation. We're proud to stand on our record: "More power to you!"

A-112-1

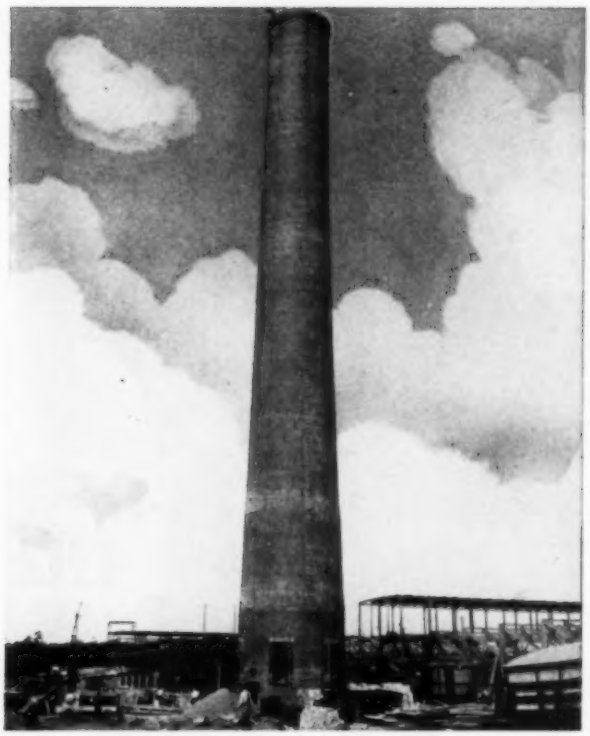
BAILEY METERS

BAILEY METER COMPANY

1028 IVANHOE ROAD
CLEVELAND 10, OHIO

Controls for Steam Plants
COMBUSTION · FEED WATER
TEMPERATURE · PRESSURE
LIQUID LEVEL · FEED PUMPS

SELECTING THE RIGHT CHIMNEY
is Important Costwise



Erected by International Chimney Corporation for American Enka Corporation, Louland, Tennessee. 200' x 15'6"

● Pictured at the left is an excellent example of the right chimney for a tough job. It was designed by International Chimney Corporation to specifically handle the diffusion of acid fumes that generate from rayon processes. The uninterrupted service, free from maintenance, given by this chimney has far exceeded the performance from regularly-designed rayon-fume chimneys — a real pay-off for its owners.

International Chimney Corporation engineers design and construct radial brick, reinforced concrete and self-supported steel chimneys for:

- **Boiler Plant Operation**
- **Incinerator Waste Disposal**
- **High Temperature Gas Diffusion**
- **Low Temperature Acid Fume Dispersion**
- **Alkaline Process Waste Gas Dissipation**

GOOD CHIMNEY MAINTENANCE
Is Good Sense

● From the standpoint of protecting your existing chimney investment, your plant operation efficiency — and for safety — it pays to keep your chimneys in top condition. International Chimney staff of maintenance engineers and skilled workmen specialize in all types of modern chimney rehabilitation.

Typical of the service offered, the illustrations at the right show the modern method of installing outside reinforcing bands to prevent formation of stress cracks. These bands installed in tension and welded in place eliminate need of unsightly lugs and bolts which will ultimately become loose and ineffective.

International Chimney's Engineering Experts will provide you with time and cost estimates . . . no obligation on your part. Write

INTERNATIONAL CHIMNEY CORPORATION

410 WICKWIRE BUILDING • BUFFALO, N. Y.

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WeldELLS®

...have set their own standards

Many of the largest users of Welding fittings refuse to accept any other fittings than WeldELLS.

They have found that when the name, WeldELL, is stamped into a fitting, that fitting can be accepted without question for any service for which it is designed.

They have found that WeldELLS have features that please both the men who design and the men who erect welded piping . . . features that were pioneered by Taylor Forge . . . features that are combined in no other welding fittings.

They have found the answer to their every need in the greater range of sizes, weights and types of the WeldELL line . . . in the broader scope of materials.

For up-to-the-minute facts
See your Taylor Forge distributor

TAYLOR FORGE

TAYLOR FORGE & PIPE WORKS, General Offices and Works: P.O. Box 485, Chicago 90, Ill.
Offices in all principal cities. Plants at: Carnegie, Pa.; Fontana, Calif.; Hamilton, Ont., Canada

The Finishing Touch

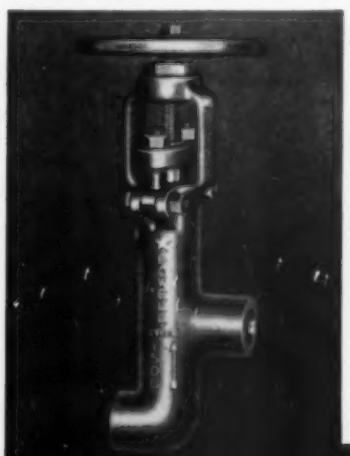
Small details can make a big difference in trimming a tree . . . and in manufacturing valves. For example, *every* Powell Valve part must pass *rigid inspection*. Then, as a final, finishing touch, each Powell Valve is subjected to *actual line tests*.

It's these seemingly small details that have helped Powell Valves maintain their record of dependability since 1846. Powell has probably done more valve research, solved more valve problems, and makes more types of valves than any other organization in the world.

With Powell Valves on the job in your plant, you'll say every day's a holiday from flow control worries. Following are just a few of the valves that have the gift of dependable service you want—and need. They're available through distributors in principal cities. If a distributor is not located near you, just write us. We'll be pleased to tell you more about these valves—and our complete line.

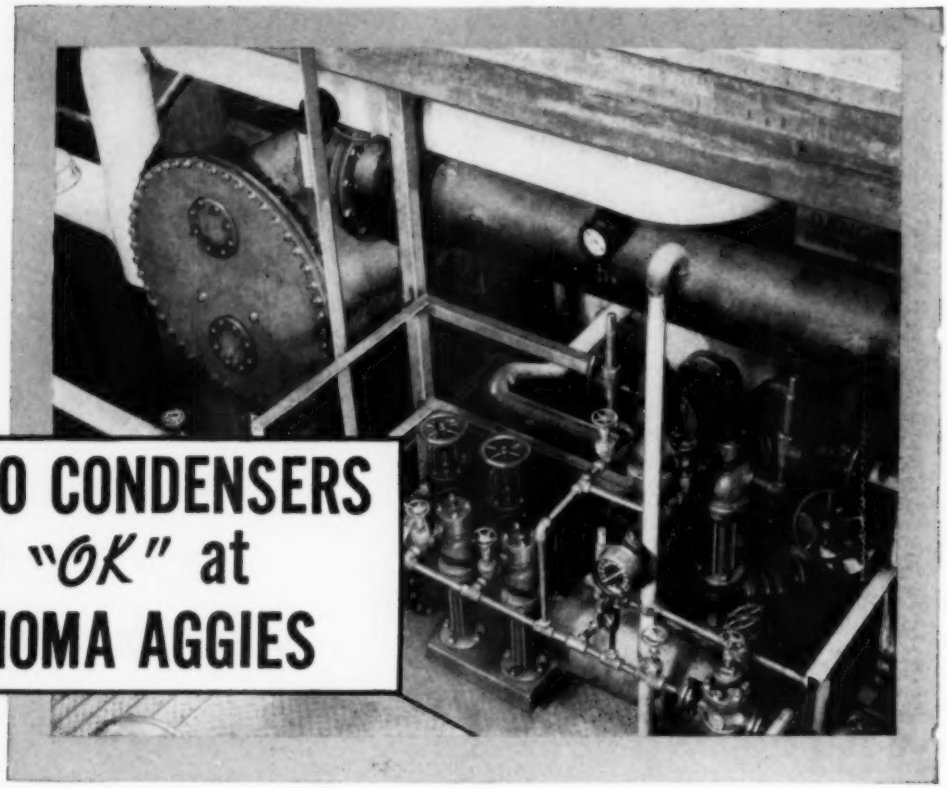
PRESSURE SEAL CAST STEEL GATE VALVE *(Fig. 11303).* 1500 pound. Many proven advantages and exclusive features. Pressure Seal Valves are also available in Non-Return, Check, Globe and Angle Patterns for 600, 900, 1500, 2500 pounds.

INTEGRAL BONNET OFFSET GLOBE VALVE *(Fig. 1331-A).* 1500-pound. One-piece construction eliminates possibility of leakage between body and bonnet. Sizes ½" to 2", inclusive.



BRONZE "W.S." FULL FLOW GLOBE VALVE *(Fig. 2608)* for 200 W.P. Stainless steel seat and disc. Nominal pipe size opening through seat permits fuller flow with pressure drop and turbulence cut to minimum.

P V



CONSECO CONDENSERS win "OK" at OKLAHOMA AGGIES

. . . *find out what these dependable units can save in your plant* . . .

Pictured above is one of the three Conseco Condenser and Ejector units installed in the power plant of the Oklahoma Agricultural & Mechanical College, Stillwater, Okla.

Each of these units, consisting of a two-pass, non-divided flow 2000 sq. ft. Conseco Condenser and a two-stage twin element Conseco Steam Jet Air Ejector, serves a 1500 kw. turbine. College engineers stamped them "OK" for dependable, money-saving teamwork.

This Oklahoma Aggie installation typifies Conseco's ability to meet modern power plant requirements. Conseco Engineers are specialists in heat exchanger equipment and their experience, together with Conseco production facilities, are available to assist you in securing worth-while savings in power production.

***WRITE** today for helpful engineering bulletins on Conseco Condensers and other equipment for power and processing plants*

Condenser SERVICE & ENGINEERING COMPANY HOBOKEN, N. J.

CONSECO

PRODUCTS INCLUDE: BOILERS . CLOSED HEATERS DEAERATORS . EVAPORATORS . STEAM JET EJECTORS

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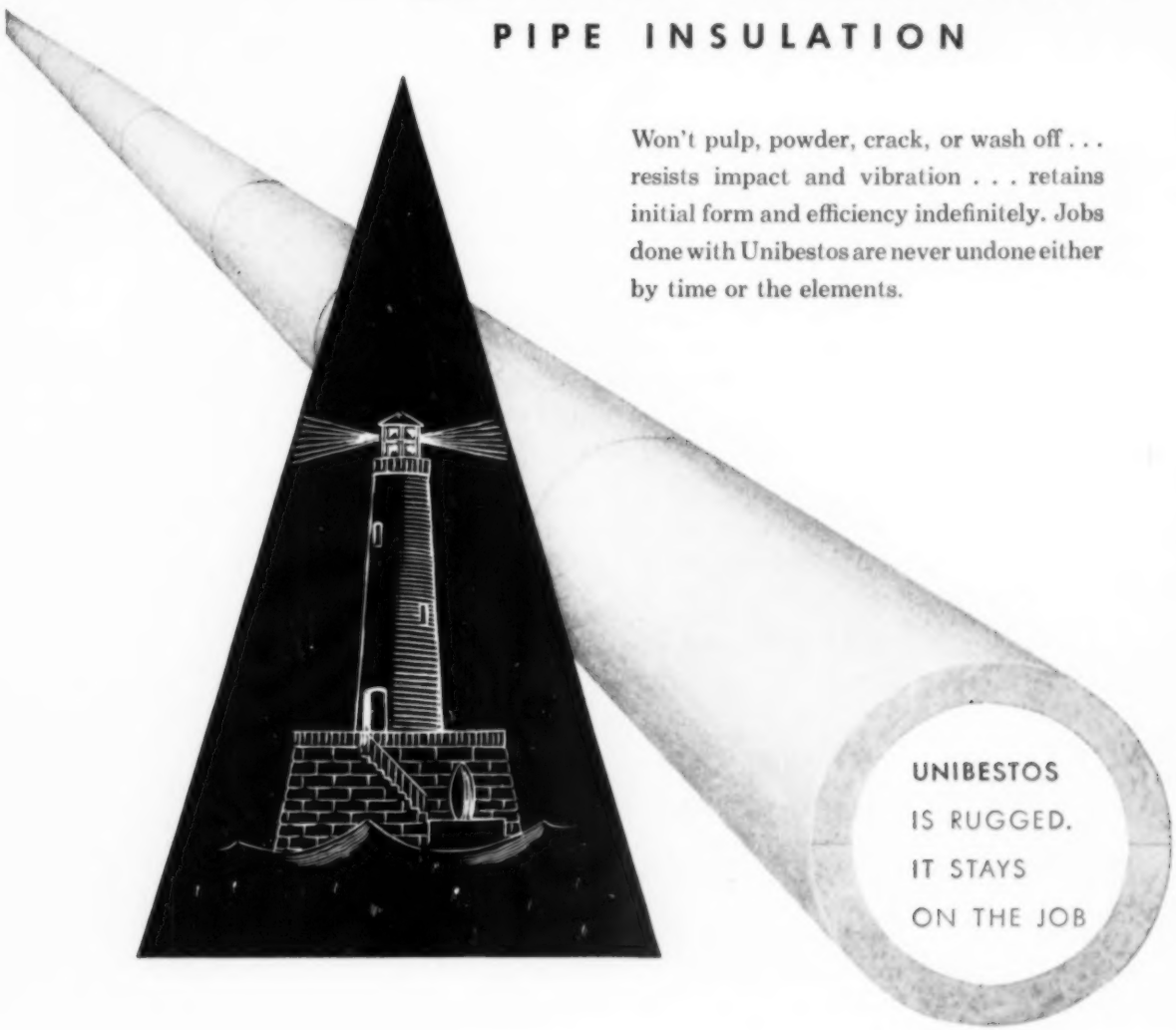
PIPE INSULATION



Won't pulp, powder, crack, or wash off . . . resists impact and vibration . . . retains initial form and efficiency indefinitely. Jobs done with Unibestos are never undone either by time or the elements.

UNARCO **UNION ASBESTOS & RUBBER COMPANY**

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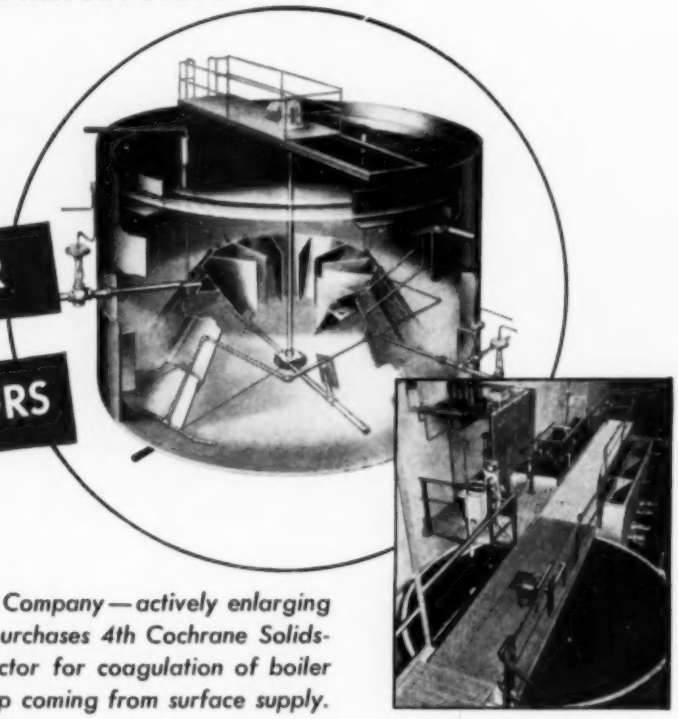
COCHRANE WATER CONDITIONING
STARTS WHERE NATURE STOPS

REPEAT ORDERS FOR COCHRANE REACTORS



Duke Power Company — actively enlarging capacity — purchases 4th Cochrane Solids-Contact Reactor for coagulation of boiler feed make-up coming from surface supply.

• This record of repeat orders is evidence of successful design and performance. Units are being built for coagulation, lime softening, iron removal, fluoride removal, white water recovery in paper mills, cooling water treatment, process water clarification, tin plate rinse water, oil field flooding water and similar applications.

They can be built in small sizes—such as for the bottling trade, or in very large sizes—such as for paper mills, up to 110′0″ dia., capable of handling more than 20,000,000 GPD in a single unit.

Write for new Solids-Contact Reactor Catalog—Publication 5001-A —just off the press.

COCHRANE CORPORATION WATER ENGINEERS FOR 90 YEARS 1863 - 1953

cochrane corp.

3110 No. 17th Street, Philadelphia 32, Pa.

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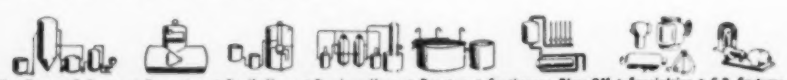
In Canada: Canadian General Electric Co., Ltd., Toronto
In Mexico: Babcock & Wilcox de Mexico, S.A., Mexico City
In Europe: Recuperation Thermique & Epuration, Paris
In Cuba: Laurence E. Daniel, Inc., Havana
In South America: Servicios Electricos, C.A. (S.E.C.A.) Caracas, Venezuela
In Puerto Rico: F. A. Ortiz & Co., San Juan 5



Hot Process Softeners • Deaerators • Dealkalizers • Demineralizers • Reactors • Continuous Blow-Off • Specialties • C-E Systems

IT WON'T BE LONG NOW!

IT'S the "end of the line" for clumsy, six-foot-long railroad tickets like this—at least on the Southern Railway. And a good thing, too!

For long streamer-like tickets can lead to short tempers. They take more time to make out. They are a nuisance to carry and hard to refold. Now, after years of research and experimentation, the first punched-card railroad tickets ever used in America are for sale on the Southern.

This new streamlined ticket—with much of the information pre-printed—will speed up ticket office sales. Actually 2½ inches by 3¼ inches in size, the new cardboard ticket is easier to carry, much simpler to handle and use. This is another better-railroading "first" pioneered and put into use by the Southern for the added ease and convenience of our customers and friends.

Harry A. DeButts
President

SOUTHERN RAILWAY SYSTEM

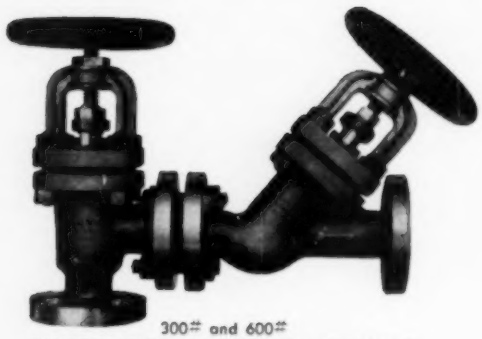
WASHINGTON, D. C.

THE SOUTHERN SR SERVES THE SOUTH

Be Sure

OF DEPENDABLE, SAFE SERVICE
SPECIFY

HANCOCK Blow-Off VALVES



300# and 600#
HANCOCK "BLO-DEFLECTOR" BLOW-OFF VALVES
Outside Screw and Yoke

Sizes: 1½", 2" and 2½".
Types: Straightway and Angle.
Connections: 300#—Flanged or Screwed Ends; 600#—Flanged or Socket Weld Ends.
Pressures at 800° F.: 300 psi, 416# Maximum Boiler Pressure—Flanged Ends; 515# Maximum Boiler Pressure—Screwed Ends. 600 psi, 785# Maximum Boiler Pressure—Flanged Ends; 950# Maximum Boiler Pressure—Socket Weld Ends.
Body: Cast Carbon Steel.
Seat: Integral. Has Cobalt Chromium Tungsten Alloy Facing.
Disc: 500 Brinell Stainless Steel.

Outstanding Features

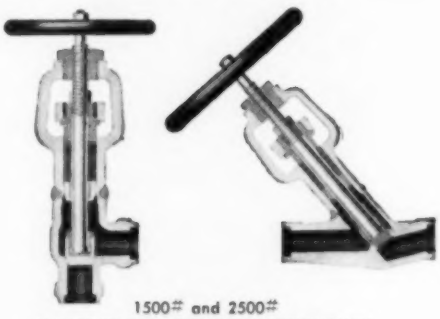
1. No body and seat joints—seat stays tight. Cost of parts and repairs reduced—seat will last the life of the valve.
2. Simple, rugged design—only 18 different parts, including nuts and bolts. "Blo-Deflector" seat and disc design makes it impossible for the velocity of the water to cut the seating surface of the disc.
3. Easy operation: No more hand power required than for ordinary stop valves. Flexible: Valve can be opened fast or slow as desired. Full hand turning power always available to close valve tightly.
4. Saves BTU's and treated boiler water through seat and disc tightness.
5. No separate so-called "quick opening" valves needed. Minimum of different parts required for tandem installation.

Hancock Blow-Off Valves provide completely reliable and safe performance in the severest services—surpass all land and marine codes and insurance provisions. They are modern valves, backed by more than 50 years of experience with the rigid operation and maintenance requirements of steam generating equipment.

Carefully selected materials of the highest quality are used to the best functional advantage to decimate wear . . . to eliminate all non-essential weight . . . to reduce overall dimensions . . . to assure easy, low-cost installation. Because they are simply designed and engineered Hancock Blow-Off Valves have a minimum number of parts—maintenance costs are negligible. Operation is smooth, efficient—you get superior performance regardless of the demands of the installation.

Whatever your boiler blow-off or water treatment practices, remember the best cost no more. Hancock Blow-Off Valves are preferred by far more design and operating engineers than any other make. So—whether you have a revalve project or are contracting for new steam generating equipment—specify Hancock Blow-Off Valves.

YOUR INDUSTRIAL SUPPLY DISTRIBUTOR is as close as your telephone. Long experience in serving industry makes him fully qualified to meet your valve needs exactly and economically. Call on him for expert counsel and prompt delivery from local stocks.



1500# and 2500#
HANCOCK STEEL BLOW-OFF WELDVALVES
Outside Screw and Yoke

Sizes: 1", 1½", 2", and 2½".
Types: Straightway and Angle.
Connections: Socket Weld Ends standard. Flanged if required.
Pressures at 1050° F.: 1500 psi, 2080# Maximum Boiler Pressure. 2500 psi, 3120# Maximum Boiler Pressure.
Body: Chrome Molybdenum Steel.
Seat: Integral. Has Cobalt Chromium Tungsten Alloy Facing.
Disc: 18-8 Stainless Steel with Cobalt Chromium Tungsten Alloy Facing.

Outstanding Features

1. No bonnet or body joints to leak, no gasket to blow.
2. No seat joints—cutting of threads between body and seat eliminated. Seat can be inspected and serviced while valve is in the line, without cutting the bonnet weld.
3. Compact—diameter and height greatly reduced. Lines can be installed closer to drums, columns and structures.
4. No bulky yoke flanges—lagging and pipe hanger costs greatly reduced.
5. 50% or more reduction in weight makes handling far easier during installation.

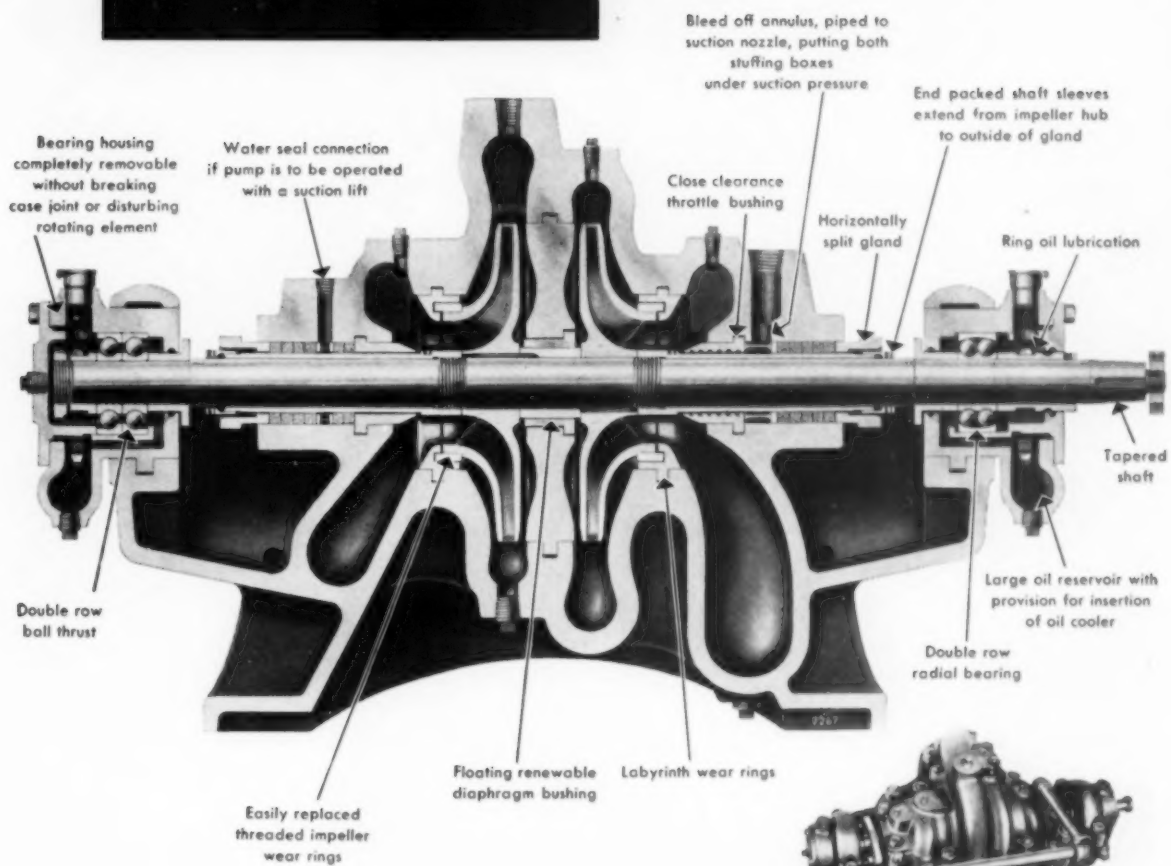
When Hancocks go in, valve costs go down

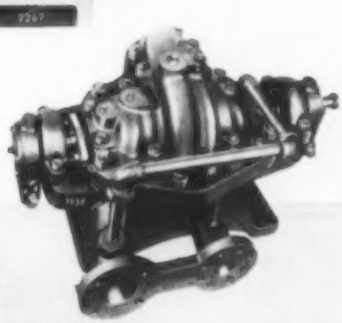
HANCOCK VALVES

A product of **MANNING, MAXWELL & MOORE, INC.** Watertown 72, Massachusetts

MAKERS OF 'HANCOCK' VALVES, 'ASHCROFT' GAUGES, 'CONSOLIDATED' SAFETY AND RELIEF VALVES, 'AMERICAN' INDUSTRIAL INSTRUMENTS, AIRCRAFT PRODUCTS. BUILDERS OF "SHAW-BOX" AND 'LOAD LIFTER' CRANES, 'BUDGIT' AND 'LOAD LIFTER' HOISTS AND OTHER LIFTING SPECIALTIES.

DE LAVAL
TWO-STAGE
HORIZONTAL PUMPS


Bleed off annulus, piped to suction nozzle, putting both stuffing boxes under suction pressure
End packed shaft sleeves extend from impeller hub to outside of gland
Bearing housing completely removable without breaking case joint or disturbing rotating element
Water seal connection if pump is to be operated with a suction lift
Close clearance throttle bushing
Horizontally split gland
Ring oil lubrication
Tapered shaft
Double row ball thrust
Large oil reservoir with provision for insertion of oil cooler
Double row radial bearing
Floating renewable diaphragm bushing
Labyrinth wear rings
Easily replaced threaded impeller wear rings



These 14 Design Features Insure Long-range, Low-cost Service

Look at the important design features highlighted in this cross-section. You will clearly see why De Laval 2IS-2KS Two-Stage Horizontal Pumps are designed to give you long, dependable, highly efficient service. ● These pumps are precision-made to quality manufacturing standards. They are available in capacities from 75 to 3,000 gpm, sizes from 2″ to 8″ discharge and heads to 750 feet. Write for Bulletin 1501 giving complete data.

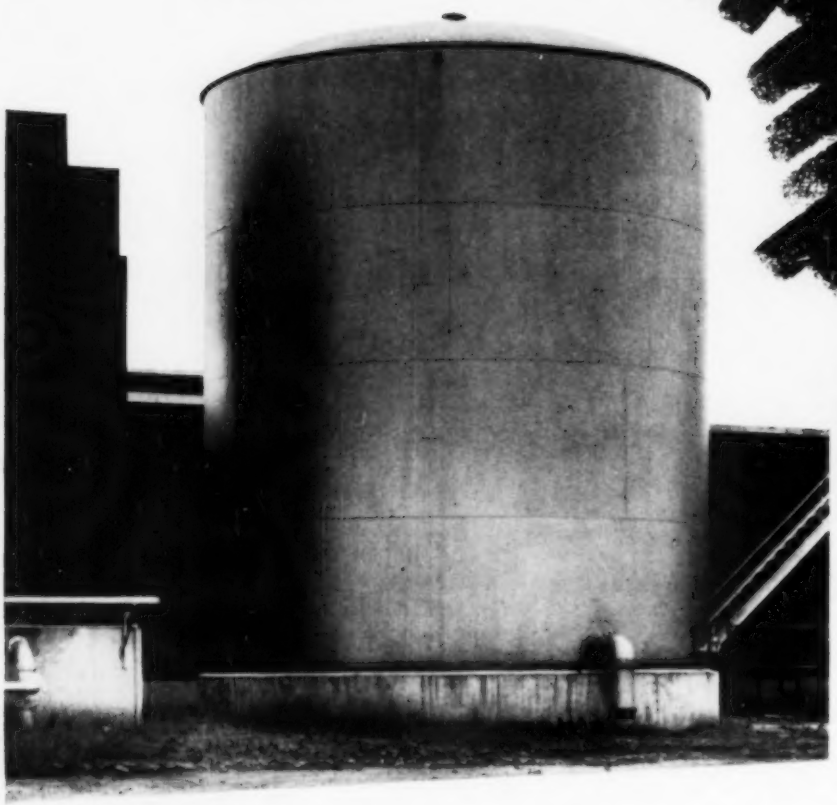
DE LAVAL *Centrifugal Pumps*

DE LAVAL STEAM TURBINE COMPANY

817 Nottingham Way, Trenton 2, New Jersey

DL-889

The Service that helps build a Better Tank for You



150,000-gal. Horton suction tank installed at a southern textile mill.

The 150,000-gal. suction tank shown above was built by the Chicago Bridge & Iron Company for a southern textile mill. During its construction our Field Welding Supervisory Service was provided *at no extra cost to the purchaser.*

The Field Welding Supervisory Service provides a welding expert to assist the Foreman in charge of the job. He helps to qualify welders, check welding equipment and inspect every aspect of the welding. He helps the Foreman with cutting and grading of the proper number of test plugs, and aids him in running any tests called for in the governing specifications. This service is standard procedure on every Horton® welded steel structure built.

Write our nearest office for estimates or quotations on a Horton suction tank, elevated water tank, storage tank or special steel plate work of any type. There is no obligation on your part.

CHICAGO BRIDGE & IRON COMPANY

Atlanta 3.....2180 Healey Bldg.
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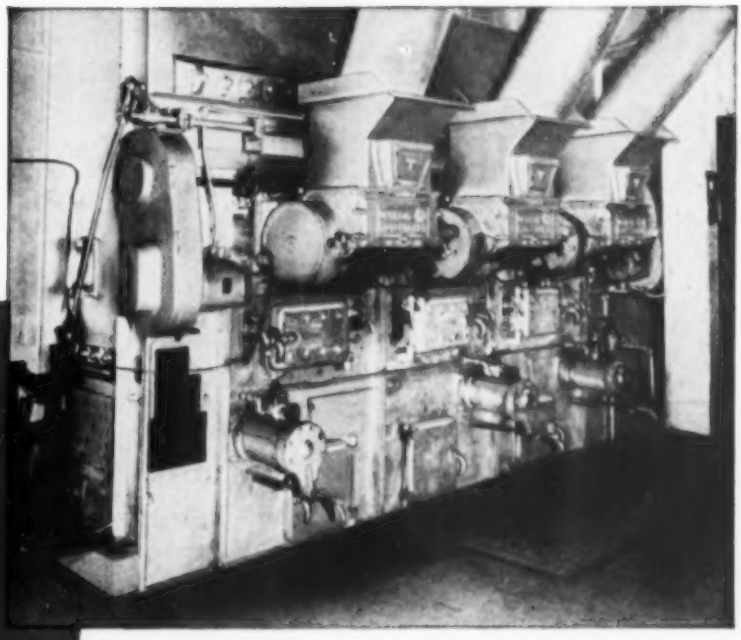
Chicago 4.....2107 McCormick Bldg.
Cleveland 15.....2218 Midland Bldg.
Detroit 26.....1534 Lafayette Bldg.
Havana.....402 Abreu Bldg.
Houston 2.....2132 C & I Life Bldg.
Los Angeles 17.1545 General Petroleum Bldg.
New York 6 ..3312—165 Broadway Bldg.
Philadelphia 3..1646—1700 Walnut St. Bldg.
Pittsburgh 19.....3252 Alcoa Bldg.
San Francisco 4 .....1531—200 Bush St.
Seattle 1 .....1345 Henry Bldg.
Tulsa 3.....1628 Hunt Bldg.

Plants in BIRMINGHAM, CHICAGO, SALT LAKE CITY, *and* GREENVILLE, PA. *In Canada*—HORTON STEEL WORKS LIMITED, FORT ERIE, ONT.



15%

FUEL SAVING

with a

NEW DETROIT ROTOSTOKER FIRED BOILER

45,000 Pound Per Hour Installation

Smoke Nuisance Eliminated

This installation, at General Mills, Inc., Buffalo, N. Y. plant is typical of Detroit RotoStoker performance. Not only was there a 15% fuel saving—smoke nuisance, long a problem, was eliminated.

Detroit RotoStokers burn economically any Bituminous Coal or Lignite without special preparation. They increase boiler capacity and respond quickly to sudden changes in load. Fuel is fed by efficient Overthrow Rotors. Fine fuel is burned in suspension—coarser fuel on the grates with uniform, but comparatively thin fuel bed.

Hundreds of Detroit RotoStokers are successfully applied to all makes and types of boilers or steam generators.

Do you need more steam at lower cost? If so, investigate the RotoStoker. Write for Catalog.

6215

DETROIT SINCE 1898 STOKERS

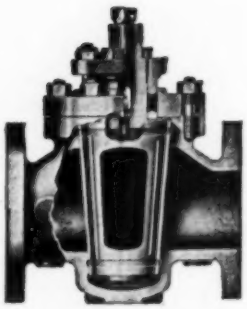
DETROIT STOKER COMPANY

General Motors Building · Detroit 2, Michigan

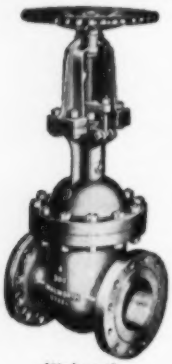
Works at Monroe, Michigan · District Offices in Principal Cities

● VALVES

● PIPE FITTINGS



Walworth
Lubricated Plug Valve



Walworth
Steel Gate Valve

Walworth
Iron Body Gate Valve

Walworth
"500 Brinell" Bronze Globe Valve

Walworth
Iron Body Saddle Gate Valve

Walworth
Cast Steel Flanged Fittings

Walworth manufactures a *complete line* of valves and pipe fittings: all made to the highest standards of quality, both as to dimensional accuracy and metallurgical properties. In design, construction, and performance, Walworth products reflect more than a century of experience in the manufacture of quality valves and fittings.

Your Walworth distributor will give you full information on the *complete line* of Walworth steel, iron, and bronze, and special alloy valves and pipe fittings; also Walworth Lubricated Plug Valves, and Walseal* valves, fittings and flanges. Ask for this information today.

*Patented—Reg. U. S. Pat. Off.

WALWORTH

valves and fittings

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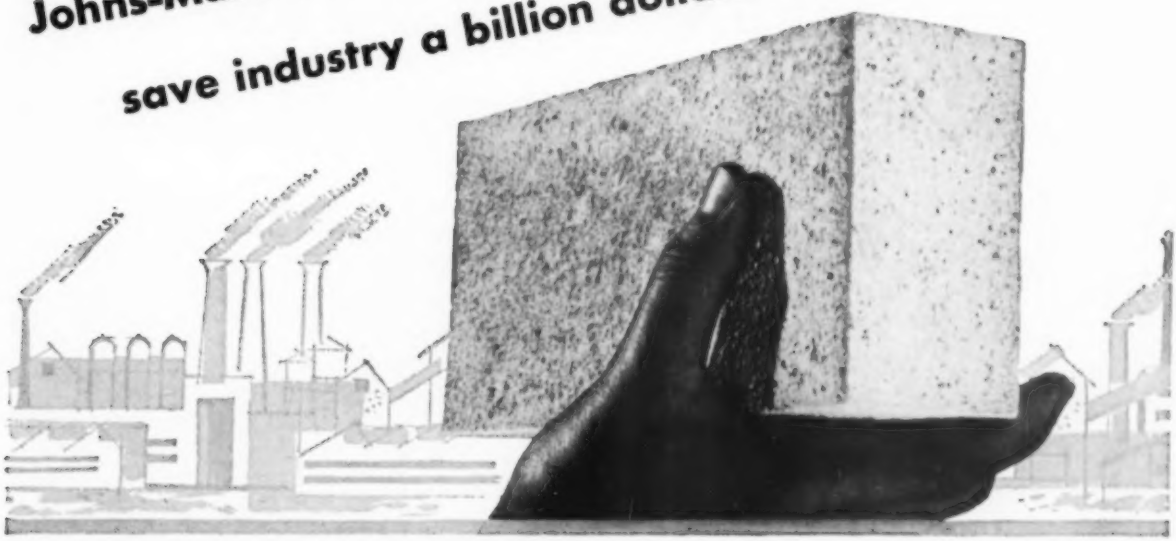
DISTRIBUTORS IN PRINCIPAL CENTERS THROUGHOUT THE WORLD

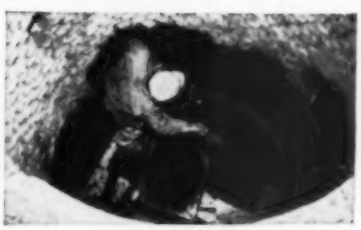
Johns-Manville Insulations save industry a billion dollars in fuel every year!



Reduce your fuel costs and build better furnace linings with JM-3000 INSULATING FIRE BRICK

HERE'S THE ONLY insulating fire brick that withstands a full 3000F. It's highly efficient both as an exposed refractory lining or as back-up insulation. And JM-3000 is only one of six types of Johns-Manville Insulating Fire Brick made for these applications. All provide long-life insulation. All are light in weight, have low conductivity, high structural strength. These properties permit thinner furnace walls—yet you can achieve important fuel savings and increased production, because J-M Insulating Fire Brick assures quick furnace response.

Sil-O-Cel* Insulating Brick is another outstanding J-M fuel-saver . . . a high load-bearing brick for back-up insulation behind refractory linings. It comes in three types, for service through 2500F—makes it possible to reduce the necessary thickness of refractory linings as much as one-third.



Save fuel with J-M Hydraulic Setting Refractories

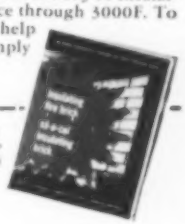
Johns-Manville refractories meet every need for castable, troweling and gunning applications for temperatures through 3000F. *Firecrete** is used to cast special shapes of all kinds. It is ready for use within 24 hours, has negligible shrinkage and high resistance to spalling. *Blazecrete** is used to build and repair furnace linings. When gunned, it adheres readily with a minimum of rebound loss. When slap-troweled, it eliminates laborious ramming and tamping.

Save Fuel with J-M Aggregates and Fills

These lightweight insulations are used as fills to conserve heat in irregular spaces where other forms of insulations cannot be economically applied. They are also used as aggregates for mixing with other materials to form insulating refractory concrete.

*Reg. U. S. Pat. Off.

Send for your free copy! This new booklet IN-115A gives full details about J-M insulating materials for service through 3000F. To find out how they can help cut your fuel costs, simply mail coupon.



JOHNS MANVILLE JM PRODUCTS

Johns-Manville FIRST IN INSULATION

Johns-Manville, Box 60, N.Y. 16, N.Y.
(In Canada, 199 Bay St., Toronto 1, Ont.)
Please send me, without charge, copy of brochure IN-115A

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COAL SAVES 30% OVER OIL!

"When we remodeled our Reading power plant, we had two good solid reasons for choosing coal as our fuel.

"First, producing steam with oil would cost us up to 30% more than coal burned the modern way.

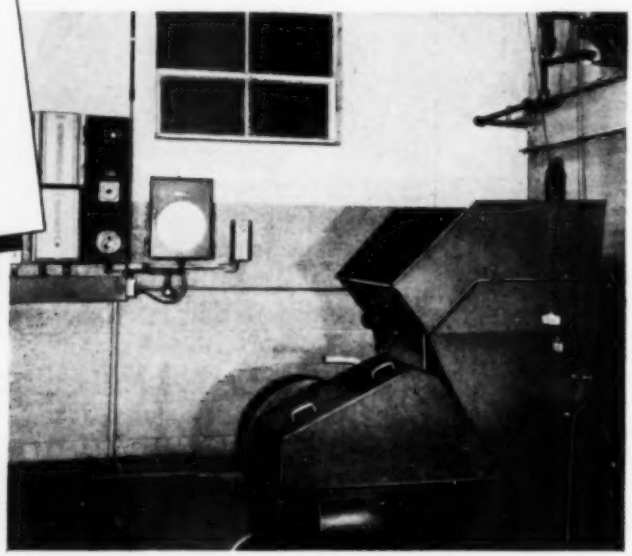
"Secondly, if we burned oil, a mechanical or electrical failure could shut us down tight. With coal, even if our single stoker broke down, we could hand-fire and keep going.

"For dependable low-cost steam, we're convinced this coal-burning installation is our best bet."

Additional case histories, showing how other types of plants have saved money by burning coal the modern way, are available upon request.

"By burning coal instead of oil, we save up to 30% on fuel costs and enjoy trouble-free operation!"

says C. R. Crowther, Vice President
Reading Glazed Paper Corp.
Reading, Pennsylvania



Here's a tip that can save you dollars on steam costs. Equip your plant with a modern coal-burning installation designed to fit your specific needs.

You'll find modern combustion equipment has made coal more economical than ever before. You'll find that up-to-date coal and ash-handling equipment will cut your labor costs and provide you with a clean, convenient, dust-free operation.

And only with coal can you be sure of a plentiful supply of fuel at relatively stable prices—now and far into the future. Coal, unlike other fuels, has virtually inexhaustible reserves. And America's highly mechanized coal mining industry is the most efficient and productive in the world.

BITUMINOUS COAL INSTITUTE
A Department of National Coal Association
Southern Building, Washington 5, D. C.

If you operate a steam plant, you can't afford to ignore these facts!

BITUMINOUS COAL in most places is today's lowest-cost fuel, and coal reserves in America are adequate for *hundreds of years to come.*

COAL production in the U.S.A. is highly mechanized and by far the most efficient in the world.

COAL prices will therefore remain the most stable of all fuels.

COAL is the safest fuel to store and use.

COAL is the fuel that industry counts on more and more—for with modern combustion and handling equipment, the inherent advantages of well-prepared coal net even bigger savings.

FOR HIGH EFFICIENCY — FOR LOW COST

YOU CAN COUNT ON COAL!

How Armstrong Traps Save you Money

Choice of body styles saves money on installation costs.

Hardened, ground and lapped valve and seat; stainless steel mechanism resists wear and corrosion—saves money on maintenance.

Two phase leverage means higher capacity in a smaller trap. Armstrong traps have optimum relation between leverage, valve travel, bucket weight, capacity and overall size.

This internal check valve saves labor and fittings required to install regular check valve.

This trap with built-in strainer costs less than separate trap and strainer—requires less labor and fittings to install.

Get the full facts on money-saving Armstrong traps. Send for free Catalog J. Clip and mail coupon today.

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806 Maple Street, Three Rivers, Michigan

Gentlemen: Please send me a free copy of Catalog J, The Armstrong Steam Trap Book.

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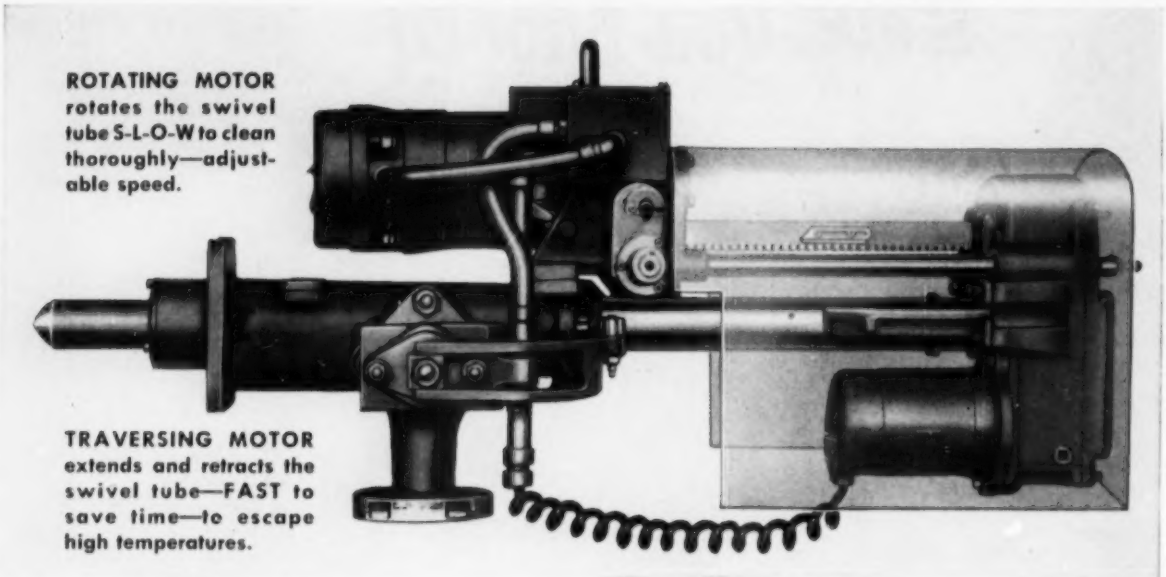
ARMSTRONG STEAM TRAPS

How to STOP SLAG BUILD-UP


ROTATING MOTOR rotates the swivel tube S-L-O-W to clean thoroughly—adjustable speed.
TRAVERSING MOTOR extends and retracts the swivel tube—FAST to save time—to escape high temperatures.

KEEP slag and sintered dust from upsetting heat-transfer capacity and superheat or reheat control. Stop their build-up—quickly and effectively—with the high-power mass blowing and fast action of Vulcan Wall Deslaggers.

Thanks to dual-motor drive—electric or air, electric shown—a Vulcan Deslagger extends into the boiler, cleans and retracts from the high-temperature zone—all in 76 seconds. The cycle can be repeated often, if needed to control deposits.

Steam, air or water—or any combination of them—may be used as the blowing medium without change in equipment. The blowing or cleaning arc can be any angle up to a full 360 degrees.

VULCAN
Dual-Motor Wall Deslaggers
With direct-acting valve
Clean BETTER and FASTER

The story is told in detail by new Bulletin 1016. Write for it.

COPES-VULCAN DIVISION
CONTINENTAL FOUNDRY & MACHINE COMPANY
ERIE 4, PENNSYLVANIA

VULCAN *Automatic Soot* **BLOWERS**

USE

MONORAIL CRANES

. . . Where Space is Limited

. . . To Handle Variable Jobs

. . . For Low Maintenance Cost

These are just a few reasons why American MonoRail Cranes are gaining in popularity and are being installed in increasing numbers of plants the country over. Call in your American MonoRail representative and have him tell you all the advantages of MonoRail Cranes such as—ease of handling—smooth travel—strength—safety interlocks—power operation and **interlocking carrier service between and beyond the craneways.** Consultation in connection with any handling problem is available without obligation.

Send for your copy of C-1 Bulletin

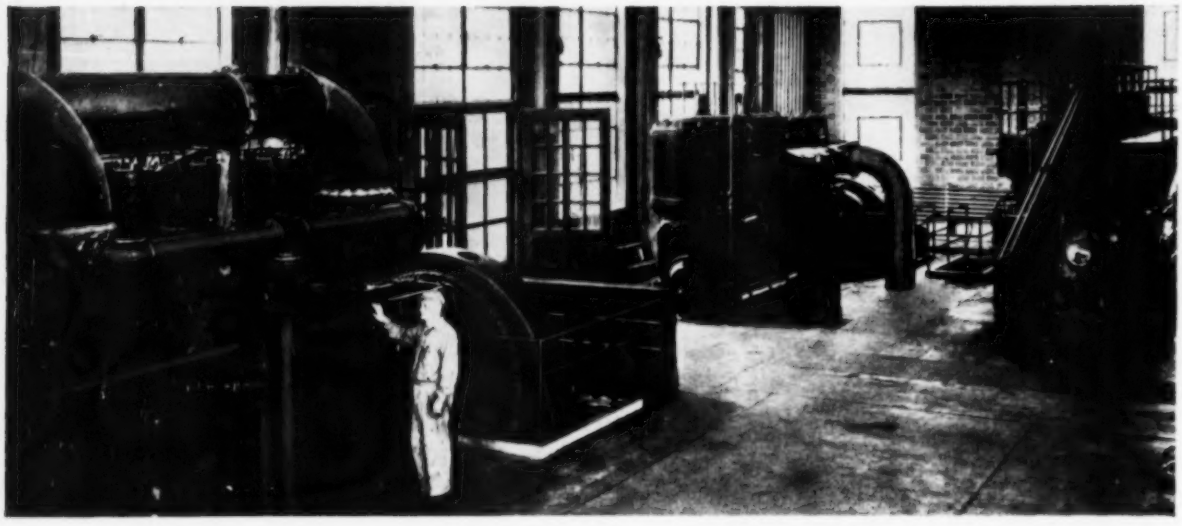
AMERICAN OVERHEAD HANDLING EQUIPMENT

MONORAIL COMPANY

13105 ATHENS AVENUE • CLEVELAND 7, OHIO

H. L. Ostness, Chief Engineer, River Falls Municipal Utility, Wisconsin, says...

"Sticking Rings are no problem in this Plant"



Mr. Ostness, as chief engineer of one of the oldest Municipal Power Plants in Wisconsin, knows diesels – *knows how to get the most out of them.* Mr. Ostness recently wrote, "We have used Sinclair Lubricants for over fifteen years very successfully. GASCON® and RUBILENE® H.D. have been doing an outstanding job in our diesels. Stuck rings is a trouble we know nothing about – engine wear is at an absolute minimum. With results like these, we'd recommend Sinclair Lubricants any time."

If your present lubricants do less, why not let Sinclair help you get longer life from your diesels – with less trouble. Contact your nearest Sinclair Representative or write Sinclair Refining Company, 600 Fifth Avenue, New York 20, N. Y.

SINCLAIR DIESEL LUBRICANTS

save wear and replacement

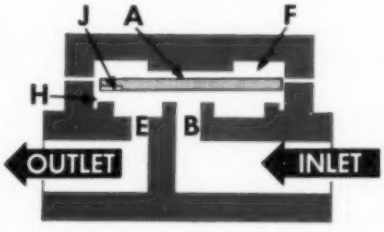
SARCO
Thermodynamic
STEAM TRAP

ACTUAL SIZE

this new trap virtually eliminates maintenance - won't wear out

SOLID STAINLESS STEEL DISC ACTS AS VALVE HEAD

HERE'S HOW IT WORKS!



Air and/or condensate raise valve seat disc A, discharge thru E. When steam follows, greater velocity causes it to strike body at H thus building up pressure in chamber F. This causes disc to seat, closing tube B. As pressure in F decreases by condensation and leakage thru slot J, pressure in tube B raises disc and cycle is repeated.

The Sarco Thermodynamic Trap has proved successful on steam mains and separators; headers and soot blower pipes; engine and turbine stop valves, separators and casing drains; alternate heating and cooling applications.

A solid stainless steel disc – practically indestructible – is the only moving part!

Most striking feature of the Sarco *Thermodynamic* Trap is its simple maintenance-free design. There's only one moving part – a solid stainless steel disc that practically lasts forever. There are no other moving parts to wear out or cause trouble.

Condensate, air and steam act directly on the disc valve which opens to discharge condensate and air – snaps shut to contain steam. There are no mechanical devices required to operate valve (see diagram at left). That means practically endless trouble-free operation.

Other advantages: small size, easy installation, not affected by shock or vibration, immunity to corrosive elements with all wearing parts stainless steel, same valve head and seat for all pressures to 600 psi and temperatures to 950° F.

Check these advantages to your own satisfaction at absolutely no cost. We'll send you a trap for free trial. All you do is fill out the coupon and mail it in.

SARCO COMPANY, Inc.
Empire State Building, New York 1, N.Y.

MAIL COUPON TODAY FOR FREE TRIAL

Sarco Company, Inc., Empire State Bldg., New York 1, N.Y.
Gentlemen: Please send me a Sarco Thermodynamic Trap for free trial, requirements as checked.
Size: ½"... ¾"... 1"... Operating Pressure:.....psi

For installation on.....

NAME _____

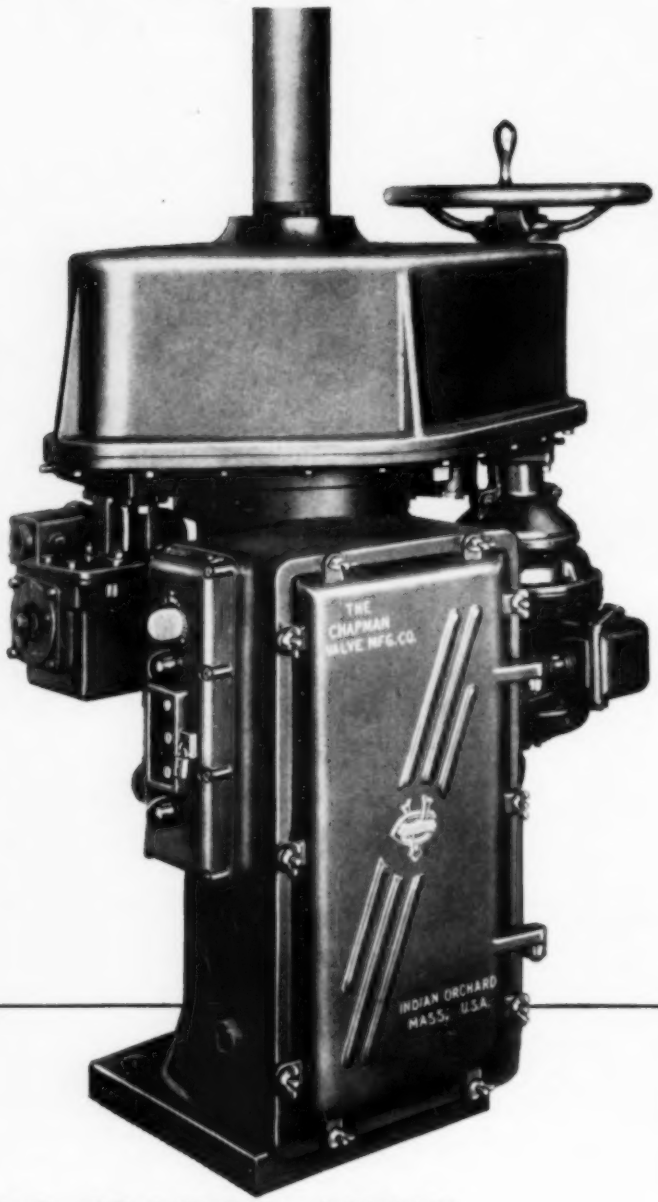
FIRM _____

ADDRESS _____

CITY _____ STATE _____

SMART OPERATOR

for Valves, Gates and Floorstands



CHAPMAN'S MOTOR UNIT

Instant control of valves and large sluice gates at the touch of a button . . . that's what you get with Chapman Motor Units on the job. Completely housed and thoroughly dust and weather proof, these units are built "to take it" for years, on the roughest service. They're designed for simplicity and extreme ruggedness, as shown by internal view above.

Chapman Motor Operated Floorstands are delivered to the job with all internal wiring complete, so all the wiring to be done is to bring the power leads into the connection box... saving time and money in installation and assuring proper operation. Write for Catalog No. 50.

The Chapman Valve Manufacturing Co.

INDIAN ORCHARD, MASSACHUSETTS

Timely Comments

New Industrial Plants

The Minimum to Cover a Mechanical Process

TODAY'S FACTORY OWNERS are forsaking the "ancestral corporate home" and are demanding more and more that their new industrial plants consist of the "minimum amount of building required to cover a mechanical process."

Translated literally, this means putting a "shell over machines," according to *Frank L. Whitney,* chief engineer of *Walter Kidde Constructors, Inc.,* engineers and builders of New York and Houston.

"There was a time," said Mr. Whitney, "when factory buildings were supposed to last at least 50 years and an 'institutional' quality was incorporated into their design.

"More recently, a factory building has been thought of as a housing for a layout of machines and operating personnel. The 'institutional' quality has been replaced with a degree of flexibility, expandability and even demountability that permits the building to change and grow as the manufacturing process itself changes and grows."

"The logical approach to this problem is a wall which can be economically expanded or revised as the production facility is expanded or revised.

"To be sure, there is opposition to new materials such as panels, and most of this opposition comes from plant owners who want masonry because they think it looks better and because it's a material they've lived with all their lives.

"Another factor that has mitigated against a wider acceptance of panels is that most of the panels on the market today were developed as cheap war and postwar substitute building materials," he continued. "Although their use has been taking hold with some difficulty, it is easy to predict their acceptance, one reason being the development of newer and better panels which will demonstrate lower maintenance cost and furnish the desired flexibility and economies."

Atomic Power Plants

New Science Will Fit Into the Old Picture

TOO MANY COOKS? Probably not. The fact that many forces, both private and government, are working toward development of atomic power plants means that the problems will be solved—and probably much sooner than was thought possible only a year or so ago.

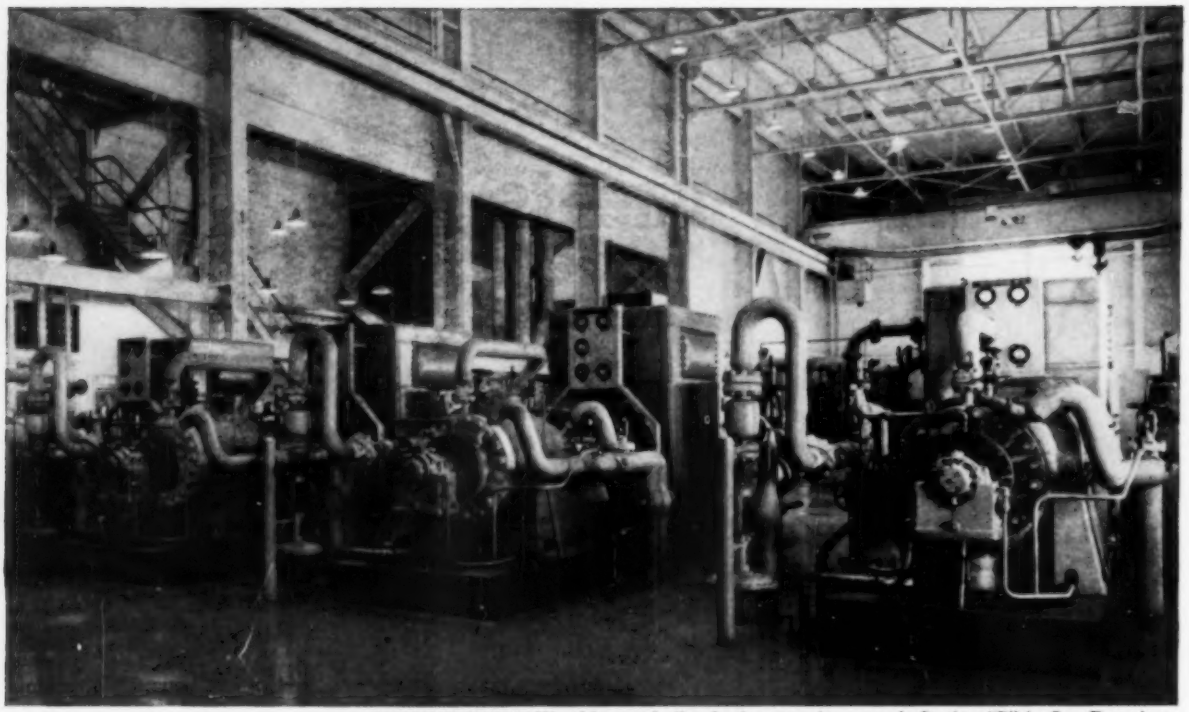
The combination of money, brains and necessity always creates a great inventive team. Lack of money has postponed many achievements that were within the capabilities of scientists for years before they became realities. In other instances, development was in advance of need. But the atomic power objective seems to have all three elements that lead to success.

Just what will be evolved remains in doubt. But with so many great forces convinced of its practicability, and able and willing to work towards its perfection, confidence in success is justified.

What will be the results? How will it affect our lives? To make specific predictions based on present limited information would be foolish. But generalized conclusions, based on the historic effect of other great achievements are more logical.

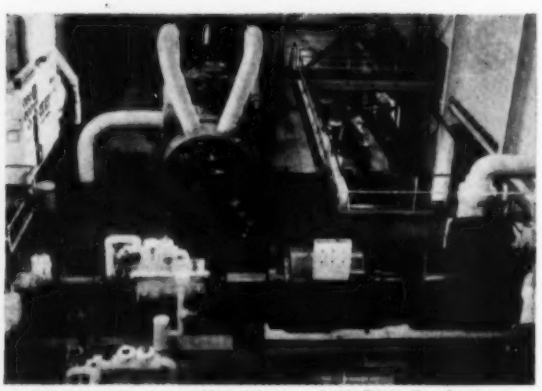
Industry and humanity react fairly slowly to scientific advances. Air conditioning is just now reaching real heights. Aluminum has not decreased the demand for steel. Silicones have not completely replaced older materials. So, we are justified in believing that the effects of atomic power (when it comes) will be gradual.

We will accept it and use it. But ten years after development it will seem less spectacular. We will still be going along in somewhat the same manner as at present. And the new science will fit into the old picture . . . we will all start talking about some new possibility (just over the horizon) that will revolutionize life on earth.



FOUR OF THE FIVE Worthington boiler feed pumps in P.G.&E.'s Station "P" in San Francisco. Each of the pumps shown here delivers 1,340 gpm against a discharge pressure of 1,868 psig.

P.G.&E. installs 45 Worthington high pressure boiler feed pumps over 15-year period



LOOKING DOWN on a Worthington 6" WCS boiler feed pump at the Oleum Station of P.G.&E.

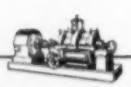
• Pacific Gas and Electric Company, with 3,540,200 kw installed capacity, serves 5½ million people in 46 of California's 58 counties. It's been building new generating plants right and left to keep up with the power needs of this booming area.

P.G.&E. is a satisfied Worthington customer. Since 1938 a total of 40 high-pressure boiler feed pumps have gone to work in seven different stations of the P.G.&E. network — proof that they do a real job for this West Coast utility. And five more of these sturdy Worthington pumps are being built for P.G.&E. right now, all designed to handle pressures over 1850 psig. This is also evidence that Worthington's design and engineering techniques are keeping right up with the greater capacities and pressures of today's steam generating units.

You can put this extensive experience in pump design and manufacture to work in your plant. For details, check with your Worthington district office or write for Bulletin W319B-1C to Worthington Corporation, Centrifugal Pump Division, Harrison, New Jersey.

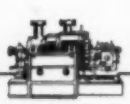
C.3.6

For Boiler Feed Service. Capacities to 1,500 GPM; Heads to 1,000 feet.



For Hotwell, Condensate, Chilled Water Service. Capacities to 1,400 GPM; Heads to 650 feet.

For Water Works, Circulation, Drainage, General Service. Capacities to 135,000 GPM; Heads to 400 feet.



For Boiler Feed Service. Capacities to 3,000 GPM; Heads to 7,000 feet.

WORTHINGTON

Centrifugal Pumps

The World's Broadest Line Assures You the Right Pump for Every Job

Industry Speaks

SOUTHERN POWER AND INDUSTRY

$25 Million TITANIUM Plant—Chattanooga

Adapted from comments by *V. P. Rumely*, Crane Co., senior vice president in charge of manufacturing, at the Cramet ground breaking ceremonies. *Cramet, Inc.*, wholly owned subsidiary of Crane Co., is building the *Chattanooga, Tennessee*, plant for the production of titanium sponge and ingots.

"WITH THE broadened use of titanium I foresee Chattanooga as one of the important titanium centers of the world. This plant alone will be responsible for the production of 6,000 tons of titanium metal a year. That is the biggest titanium operation so far undertaken. Only a few years ago (1950), the experts were impressed by the country's total production of 75 tons. Within a few years we will look back on the figure of 6,000 tons a year and smile.

"There is an oft-cited comparison between titanium and aluminum. When the Washington monument was erected, it was capped with aluminum at a cost of $28 a pound. You know how widely used and inexpensive aluminum is today. Many people wince at today's cost of titanium—$20 a pound in sheets; $15 a pound in bars, and $5 a pound in the sponge stage.

"But we are only at the beginning, just as aluminum was being pioneered a short while ago. I earnestly believe that titanium will follow a pattern similar to that of aluminum: comparatively high cost until volume production is underway—then watch out.

"Crane Co. worked hard and earnestly for the opportunity to pioneer in this new metal. It presents a challenge that we are looking forward to with relish and confidence. Crane Co. has always welcomed a challenge. In our 98-year history we have worked with all kinds of industrial metals. Our first shop made its first products out of copper. In the intervening years our plants have successfully tangled with cast iron, brass, bronze, steel, alloy steels, aluminum. Now we are on the threshold of what is perhaps the greatest challenge ever to confront us—titanium.

"As Crane Co. nears its 100th anniversary, it can look back over an era that can rightfully be labeled, *From Copper to Titanium*, an era that began with the most primitive of tools and methods and hardships and today has reached a point of engineering ingenuity, mass production and vastly improved working conditions.

What About Titanium?

"Titanium is the fourth most abundant structural metal in the crust of the earth. Only aluminum, iron and magnesium are more commonplace. More titanium exists than all the lead, zinc, tin, antimony, nickel, copper, gold and silver combined.

"It is classified as a light metal many times stronger than aluminum. It also is 40% lighter and exceeds the tensile strength of many steels.

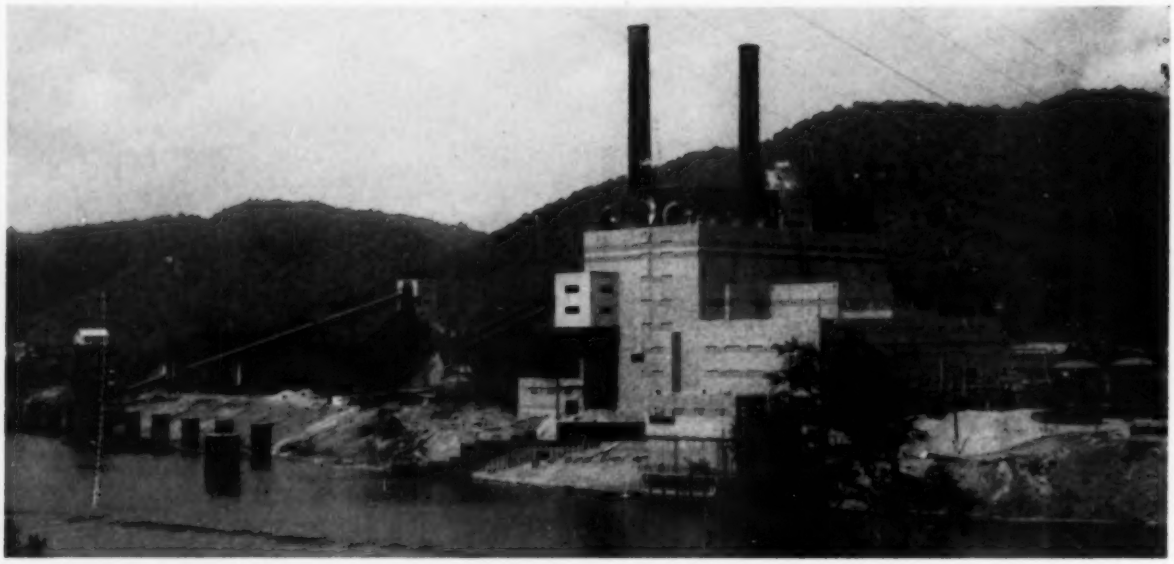
"I want to emphasize that no one in Crane Co. and our subsidiary, Cramet, even thinks that titanium will replace either aluminum or steel. That has never been our intention. Titanium will establish its own place in our economy.

"While titanium itself is indeed a remarkable metal, we expect additional qualities to materialize by alloying it with such metals as chromium, aluminum, molybdenum, and iron, etc. Such alloying will produce titanium products that have a greater strength-weight ratio than alloy steels.

"This project is the outgrowth of our pilot plant that has been in operation over two years. Research is continuing toward development of new and improved techniques for the production of titanium."

Dr. P. W. Bakarian, expert on light metals, has named plant manager of **Cramet Inc.**, wholly owned subsidiary of Crane Co., which is under construction at **Chattanooga, Tennessee**, for the production of titanium sponge and ingots. Partial operation is scheduled for late 1954.

He formerly was employed by Dow Chemical Company, Midland, Mich., was chairman and managing director of Almag Engineering Company, Ltd., of Liverpool, England, and was on special assignment for the United States Department of State and the Department of Commerce. During World War II, Dr. Bakarian served as a major in the Air Force.



THE NEW 400,000 KILOWATT KANAWHA RIVER PLANT of Appalachian Electric Power Company at Glasgow, West Virginia, as it appears from the river side. The first of two 200,000 kilowatt units is now in service, and the second unit is nearly ready to go on the line.

2,000 Pound Boilers—330,000 Volt Line

Appalachian Electric Power Company . . . Near Charleston, West Virginia

This 200,000 kw unit, operating at 2,000 pounds and 1,050 F, connects to the first 330,000 volt line in America. The turbine is the largest reheat type unit in this country and the boiler is the largest ever built.

THE FIRST turbo-generating unit at the new Kanawha River Plant of Appalachian Electric Power Company is now in service. Named after the river on which it is located, at Glasgow, West Virginia, this plant is 20 miles southeast of Charleston. The 200,000 kilowatt unit, largest reheat type generating unit in service in the country, is feeding energy into the seven-state transmission network of the American Gas and Electric System. Appalachian is the largest operating electric utility subsidiary of AGE. Construction on the first of the two units began in October, 1950, and the second unit is scheduled for operation late in 1953. The cost of the 400,000 kw capacity plant is estimated at $46,000,000.

Embodying the latest skills in engineering, research and design, this plant will become one of the most economical producers of electricity in the nation. The 400,000 kw plant will burn about 1,023,000 tons of coal a year. This coal will

ACKNOWLEDGMENTS:

Material for this article was developed through the assistance of Appalachian Electric Power Company, and American Gas and Electric Service Corporation. Parts of the description and the table of principal equipment were prepared by AG&E engineers. A large part of the technical information presented was abridged from three companion papers appearing in the July, 1952 "Transactions of the ASME," titled "The Development and Implementation of a Generation Program on the American Gas and Electric Company System," by Philip Sporn, president; H. A. Kammer, vice president, and S. N. Fiala, mechanical engineer, all of the American Gas and Electric Service Corporation.

come from southern West Virginia coalfields.

Each 200,000-kw unit will be supplied with steam from a single boiler which is the largest single steam generating unit for the production of power ever contracted for. It is expected that this plant will produce a kilowatthour from 7/10 of a pound of coal.

Each of the boilers is 123 ft high and occupies a space 56 by 60 ft. They are equipped with 2,400-ton overhead coal bunkers. The boilers will operate at a steam pressure of 2,075 psi and have a rated steam output of 1,335,000 lb/hr.

The plant is equipped with the most modern, highly efficient equipment for the removal of fly ash from combustion gases. Located on the roof is a combination mechanical-electrostatic precipitator for each unit. It is expected that about 95% of the fly ash will be removed this way. The small percentage remaining will be exceedingly fine and will be dissipated in the upper atmosphere.

The new Kanawha River Plant is linked to Appalachian's and the AGE System, not only by 132,000 volt lines, but also by the first 330,000 volt line ever built in the nation. The first link of this 330,000 volt transmission network, which eventually will connect all major plants and load centers of the AGE System, is a 63-mile line from Kanawha River Plant to the new Philip Sporn Plant at Graham Station, West Virginia. The conductor for the lines is over 1½ in. in diameter. It consists of a 19-strand steel core, two layers of special paper cords as a "filler" and two conducting layers of aluminum wires—more than 50 in all. At this voltage, more power can be delivered over a single line than over a half-dozen lines of 132,000 volts and at much less cost.

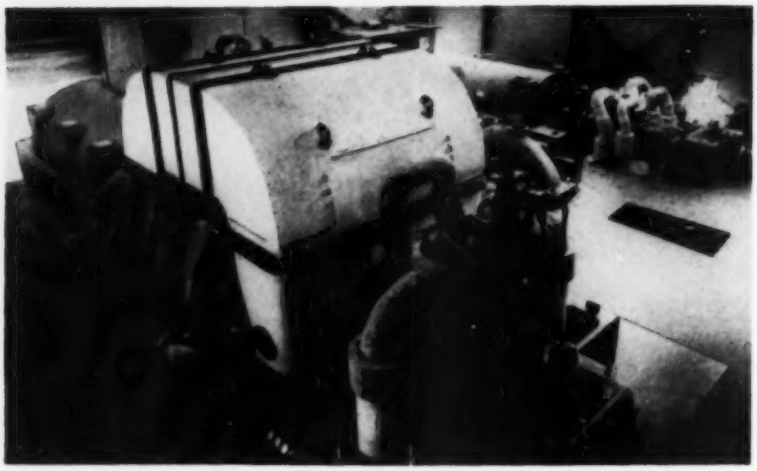
MAIN TRANSFORMERS where the voltage is stepped up for transmission purposes. The fly ash precipitators are on the roof. Work is continuing on the nearly complete second unit in the righthand portion of the building.

At peak of construction at Kanawha River Plant more than 1,800 people were employed. *Sollitt Construction Company* of South Bend, Indiana, is the general construction contractor. *R. H. Lawson* is supervising engineer in charge of construction for Appalachian. *Henry C. Skaggs, Jr.*, is operating manager of the new plant. He formerly was assistant manager of the Cabin Creek Plant of Appalachian. When the plant is in full operation it will employ about 130 people.

DESIGN FEATURES

The power plant sub-structure is reinforced concrete, and the superstructure is structural steel frame with composite masonry walls made up of Speed-a-backer tile and 4 in. of brick. All equipment is housed within the building except the fans, air heaters, dust collectors and connecting duct work. Wood piles extending into coarse sand and gravel strata support the boiler room, heater bay and office building por-

COAL STORAGE YARD for the plant is capable of holding about 500,000 tons of coal. At the time this photo was made there were over 300,000 tons of coal on the yard. The conveyor system carries the coal through automatic sampler, scales, crusher, and shaking screen to a live storage pile and thence into the plant. The conveyors vary in size from 42 in. wide to 45 in. wide and move at the rate of 500 to 550 fpm.



HIGH AND LOW PRESSURE TURBINES of the 200,000 kw unit are arranged cross compound. The 140,000 kw, 1800 rpm low-pressure unit is in foreground, and the 60,000 kw, 3600 rpm high-pressure unit is in background. Insulation and covering were not complete when photo was made.

tions of the structure. The condenser pit, turbine room, turbine and other foundations are on the sand and gravel strata.

Equipment in the plant was arranged to give the most compact and economical layout attainable, which resulted in only 19.3 cu ft of building volume per kilowatt, including all service and office facilities. Recent developments in remote operation through centralized control rooms made possible locating the control room on the roof of the turbine room, without detrimental effects on plant operation. This also helped hold building volume to a minimum.

Boiler ash and fly ash is pumped to a pit downstream from the plant and landward of the coal storage pile. When this space is filled, the coal storage will be extended over it to provide for expansion of the plant, and ash disposal will be moved farther landward.

The Cycle

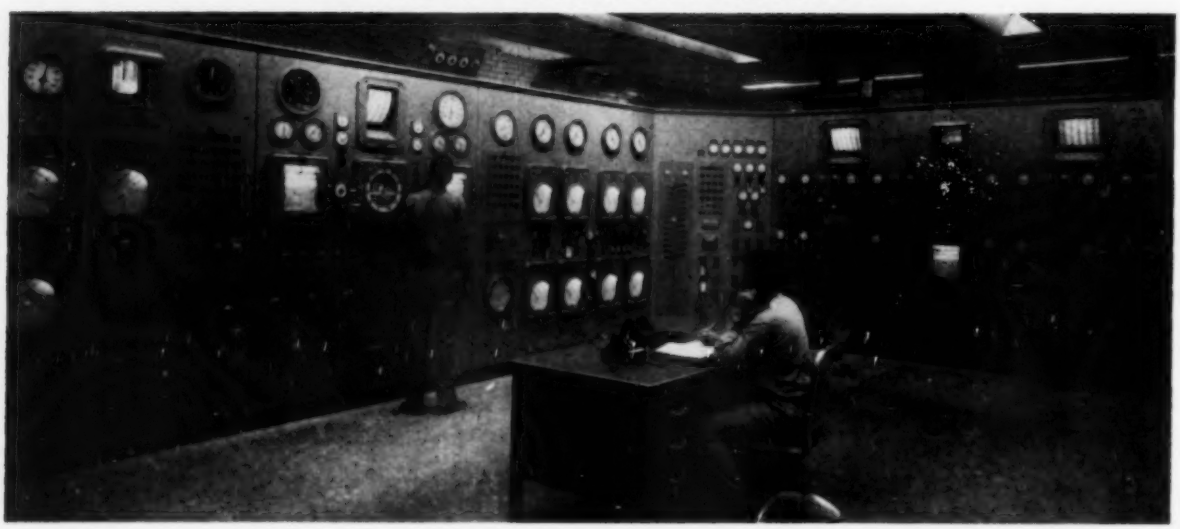
Essential details of the operating cycle are shown in the accompanying flow diagram. Over-all plant economy is estimated at slightly over 9,000 Btu/kwh. These calculations are based on full load with average allowances for losses and auxiliary power. Seven stages of extraction feedwater heating are provided, with an extreme full load feedwater temperature of 461 F.

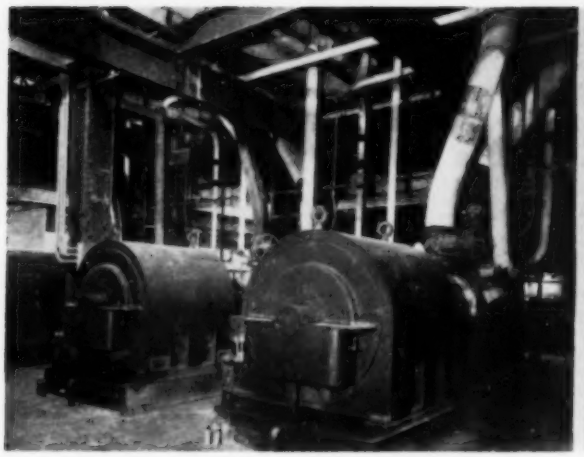
The Boiler

In view of previous successful experience with natural recirculation boilers operating above 2,000 psi, there was no concern regarding the adequacy of natural circulation for the conditions of this plant. Extensive tests had demonstrated that the separation of steam and water provided by the cyclone steam separators assured a more than adequate differential head for proper circulation. These tests also demonstrated that circulating flow in individual tubes, as well as the over-all circulation rate, increases with increases in the rate of heat absorption.

A cross-section view of one of the boilers is presented. This boiler is equipped with a dry-bottom type furnace in order to handle high ash fusion coals. Each boiler is designed for a furnace heat input of 1.84 billion Btu per hour. In terms of heat input, these boilers are among the largest, if not actually the largest, steam boilers ever built. Primary steam flow is 1,335,000 lb/hr and reheater flow is 1,216,000 lb/hr. The furnace is 56 ft wide by 27 ft deep, with an average height of 90 ft.

THE CONTROL ROOM FOR THE FIRST 200,000 KW UNIT.





THE BOILER FEED PUMPS force 163,000 gallons of water into the boiler for unit one every hour under a pressure of 3,000 psi. One of the three pumps serves as a spare. Each pump is driven by a 2,500 hp motor.

EIGHT BALL PULVERIZERS prepare 80 tons of coal per hour, delivered through bunker spouts to the first unit. Pulverizers have ample capacity to handle low grade coal, and a spare is provided for maintenance purposes.

Each boiler is furnished with three Ljungstrom regenerative air preheaters which bring the combustion air to 550 F. There are three induced-draft fans and two forced-draft fans, the latter being sized and motored for full pressurized furnace operation. The induced-draft fans are equipped with tight shutoff dampers and bulkheading arrangement to permit maintenance of any one of the three fans while the boiler is in operation.

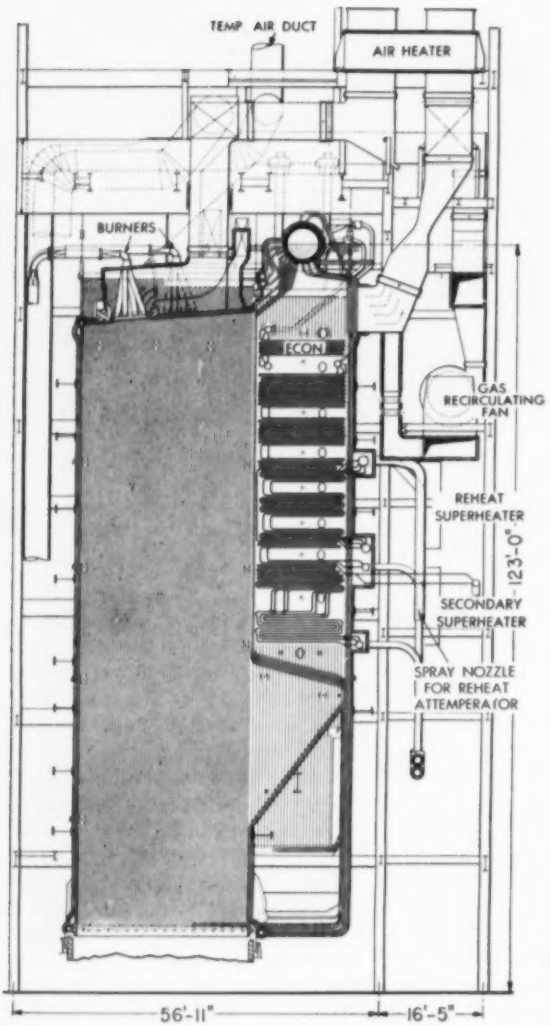
The boiler casing is designed for pressurized furnace operation. Such operation provides better control over furnace combustion conditions, improved temperature control, and increased efficiency through reduced stack losses. Appreciable operating savings through reduction of induced-draft fan power requirement is expected. The induced-draft fans are provided to avoid any possibility of boiler outages during peak load operations as a result of casing leakage. Investment in these fans is also justified by improved flexibility in operation, although it is expected the boilers will operate without induced-draft fans approximately 95% of the time.

Superheaters and reheaters are entirely in the form of convection surface. The problem of slag formation and removal resulting from high gas temperature required for all-convection surface arrangement has been found to be controllable, and the difficulties so introduced are more than offset by advantages accruing from elimination of radiant superheater and reheater surface.

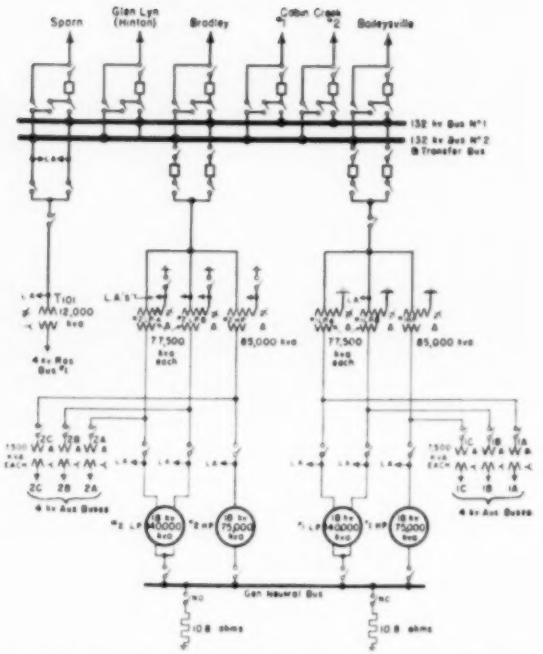
Superheater and resuperheater surface has been divided and so arranged as to give necessary temperature control with minimum use of reheat attemperation, and without danger of overheating reheater tubes during periods of trip-out, starting and shutting down. Superheat and reheat control below full load will be obtained primarily by recirculation of flue gas from economizer outlets to the furnace, with water spray attemperation at the reheater inlets and between stages of the superheater for critical temperature control.

The boiler is arranged with an independent furnace ash removal system, with no interconnection to future units. Ash from two identical dry bottom furnace hoppers is collected in twin water-filled ash pits, from where it is discharged periodically through a double row clinker grinder to a common sump. From the sump, the ash water mixture is pumped to storage.

TWO FORCED DRAFT FANS are sized and motored for full pressurized furnace operation.



CROSS SECTION OF STEAM BOILER



SIMPLIFIED ELECTRICAL DIAGRAM OF PLANT

Combustion Control

Each unit is provided with pneumatic-operated control systems for controlling boiler drum level, steam temperature, and combustion. The boiler drum level control is the standard three-element type using steam flow, water flow, and drum level. The one automatic water control valve is provided with two remote-controlled motor-operated bypass valves.

Superheated steam temperature is controlled by attemperator sprays located between the primary and secondary superheaters. Reheated steam temperature is controlled by varying the recirculating gas flow with attemperator sprays to handle extreme conditions. The recirculating gas flow control uses a measurement indicative of the heat input to the reheater as well as final steam temperature to provide better response.

The combustion control maintains a constant boiler steam pressure by varying the coal fed to the furnace. Another section of the control varies the air flow from the forced draft fans in accordance with the fuel flow. Flue gas analyzers (oxygen type) are provided to give a check on the accuracy of the air flow.

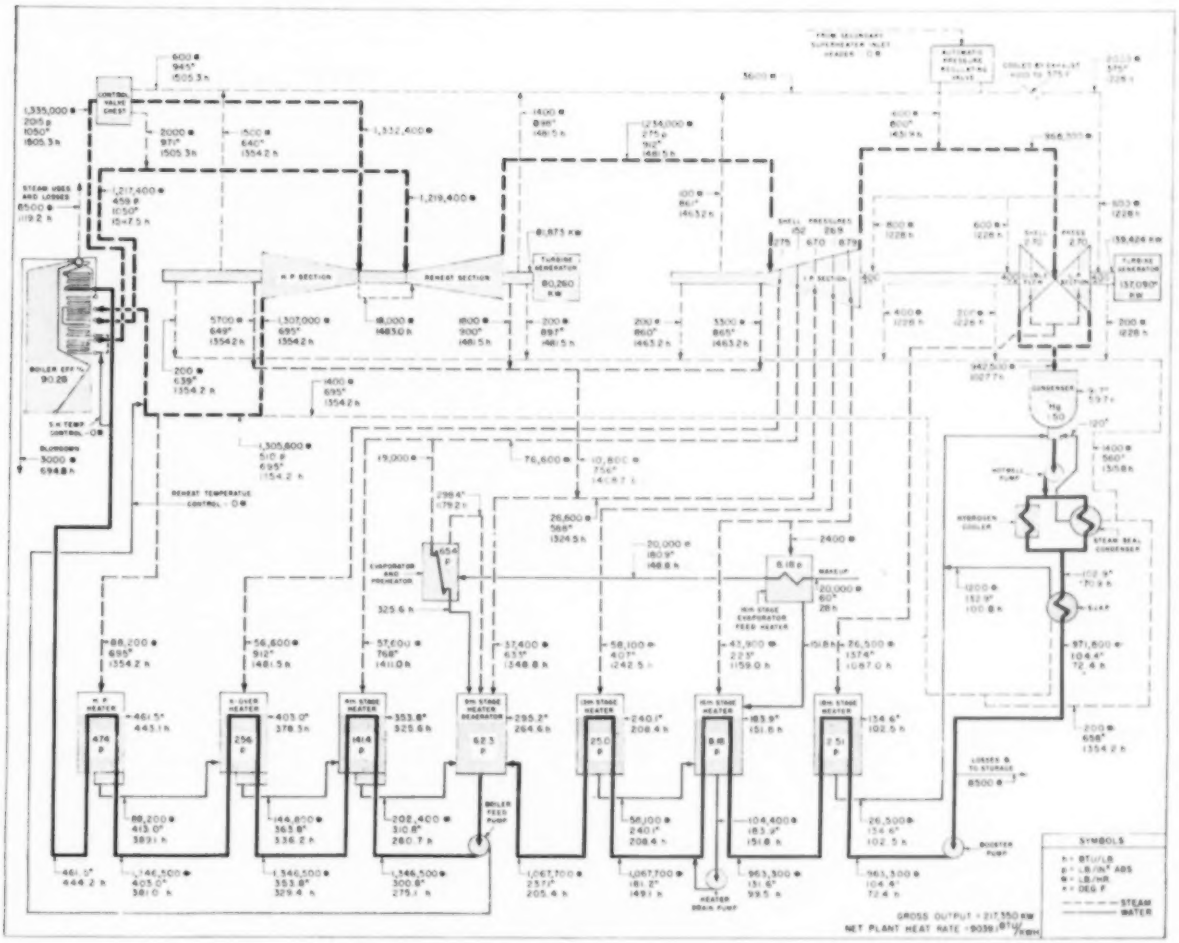
When on pressure operation of the furnace, no furnace draft control is required. A conventional furnace draft control is provided to operate the I.D. fans when on suction operation.

The boiler feed pumps are horizontal, single suction, 10 stage, each rated at 1,600 gpm. There are three of these pumps although only two are required to handle full load so that one pump is always a spare. The pumps have Monel shafts and two casings, an inner one built of ring segments or alloy steel and an outer barrel-shaped one of ordinary steel. Each pump is directly driven by a 2500 hp, 3580 rpm motor. There is a take-off at the 4th stage of the pump to furnish 50 gpm at approximately 960 psi to the reheat attemperator to regulate reheat steam temperature.

Evaporators and Treatment

Raw river water is used for makeup in the plant, with the result that a clarifier is used along with filters and water softeners, to modify the water before it passes to the evaporator.

Treated makeup water en route to the evaporator receives a preliminary warming while passing through the evaporator feed heater. This feed heater is a closed, 6-pass, U-tube heater, which receives its heating steam from the low-pressure turbine extraction line, serving the 16th stage heater. The makeup water is then deaerated



HEAT CYCLE DIAGRAM FOR NORMAL FULL-LOAD OPERATION

and further heated in the evaporator preheater, with the steam used for deaerating being a portion of the vapor which is generated in the evaporator. The preheater is guaranteed to deaerate up to 36,000 lb/hr of makeup water, using 3 groups of trays, 2 lower and one upper. The trays and also the heating compartment at the top of the preheater are of type 430 stainless steel.

The heat source for the evaporator is extracted steam from the 4th stage of the intermediate pressure turbine. The evaporator is made by The Griscom-Russell Co. and is of the U-tube type, with 1,042 sq ft of heating surface and a net capacity of 27,000 lb/hr. The makeup vapor enters the cycle in the main deaerator.

The turbine generators are arranged cross-compound. Gross capability of each unit is approximately 217,260 kilowatts, operating with 1½ in. Hg back pressure.

Two emergency stop valves are provided for each unit to accommodate large steam volumes. These are welded directly to each end of an external control valve chest below the turbine floor. Steam at 2,000 psi and 1,050 F enters the stop-valve inlets and flows to the turbine through six control valves and six connecting pipe lines.

The external valve chest makes possible the concentration of high temperatures on a relatively small portion of the high-pressure turbine shell and allows use of a forged valve chest. Aside from internal valve parts of austenitic material in the emergency stop valves and control valves, all high-temperature elements operating at 1,050 F are made of ferritic chrom-moly-vanadium material.

Both initial and reheat steam enter the turbine at adjacent points located near the middle of the high-pressure turbine shell. This arrangement, in conjunction with elimination of intercept valves at the turbine reheat steam inlet, has simplified many problems associated with high-temperature design.

High-temperature steam, entering the high-pressure turbine shell near its midsection, travels toward the front standards through eight stages and discharges to the steam reheater at 490 psi when operating at full load.

Returning from the reheater at 1,050 F, the steam again enters the high-pressure turbine shell midsection at a point adjacent to the initial steam inlet. From this point it flows toward the coupling and through three stages. The steam

PRINCIPAL EQUIPMENT

Kanawha River Plant, Appalachian Electric Power Company, Glasgow, West Virginia

TURBINE—GENERATORS

Turbine ..... General Electric Co., 160,000 kw, 3600/1800 rpm.

Generators ..... General Electric Co.
High Pressure—64,250 kw, 75,000 kva, .85 pf, 18,000 volts, 3-phase.
Low Pressure—112,000 kw, 140,000 kva, .80 pf, 18,000 volts, 3-phase.

Exciters ..... General Electric Co.
High Pressure—250 kw, 3600 rpm, 250 volts, direct connected
Low Pressure—410 kw, 1800 rpm, 250 volts, direct connected

Turbine Oil Coolers ..... Schutte and Koerting, twin oil coolers, tubular, with 1532 sq ft cooling surface, are installed in the turbine oil tank.

Turbine Oil Filters ..... One—Alsop Engineering Corp., capacity 10 gpm.

CONDENSING EQUIPMENT

Condenser ..... One—Allis-Chalmers Mfg. Co., single pass, cooling surface 30,000 sq ft, reversible flow.

Circulating Water Pumps ..... Two—Allis-Chalmers Mfg. Co., single stage, vertical, volute type, centrifugal, 70,000 gpm each; driven by Elliott induction motor, 225 rpm, 3-phase.

Condensate Pumps ..... Two—Allis-Chalmers, Mfg. Co., single stage hotwell pumps, 2400 gpm, driven by 100 hp, 3-phase, 60 cycle, 900 rpm Allis-Chalmers motor, in series with two Allis-Chalmers single stage condensate booster pumps, driven by 3-phase, 60 cycle, 300 hp, 1750 rpm Elliott motors.

Air Removal Equipment ..... One—Allis-Chalmers Mfg. Co., 2 stage, triple element, steam jet ejector, with surface type inter and after condensers.

BOILER FEEDWATER EQUIPMENT

Boiler Feed Pumps ..... Three—Ingersoll-Rand, 10 stage, capacity 1,600 gpm, head 2395 psi differential, speed 3580 rpm; driven by Elliott 2500 hp, 3580 rpm, 4000 volt motor.

Extraction Heaters ..... Griscom-Russell Co.
Two—horizontal, high pressure, 2 pass, U-tube, 2970 sq ft each;
Two—crossover, 2 pass, U-tube, 2915 sq ft each;
Two—4th stage, 2 pass, U-tube, 3590 sq ft each;
One—13th stage, 2 pass, U-tube, 4090 sq ft;
One—16th stage, 2 pass, U-tube, 4240 sq ft;
One—18th stage, 2 pass, U-tube, 4860 sq ft.

Deaerator ..... Elliott Company
One—1,000,000 lb per hr rated capacity;
Two—evaporator preheaters, 36,000 lb per hr rated capacity.

Evaporators ..... Two—Griscom-Russell Co., U-tube type, capacity 27,000 lb per hr each, 1,042 sq ft heating surface.

Feedwater Regulator ..... One—Bailey Meter Co., 3 element feedwater control system.

STEAM GENERATING EQUIPMENT

Boiler ..... The Babcock & Wilcox Co., radiant reheat type furnace, capacity 1,335,000 lb per hr, drum design pressure 2400 psig, 1050/1050 F.

Economizer ..... Continuous type

Air Heaters ..... Three—Air Preheater Corp., regenerative type.

Soot Blowers ..... Diamond Power Specialty Corp.

Pulverizers ..... Eight—The Babcock & Wilcox Co.

Feeders ..... The Babcock & Wilcox Co.

Burners ..... Sixteen—The Babcock & Wilcox Co., intertube burners.

DRAFT EQUIPMENT

Forced Draft Fans ..... Two—Westinghouse Electric Corp., Sturtevant Division

Induced Draft Fans ..... Three — Westinghouse Electric Corp., Sturtevant Division.

CONTROL PANELS

Main Control Room Panels ..... Falstrom Company, assembled and wired by A.G.&E.

Local Panels ..... Kelek Company, assembled and wired by A.G.&E.

INSTRUMENTS

Steam Flow Meter ..... One—Bailey Meter Co.

Feedwater Flow Meter ..... One—Bailey Meter Co.

Pressure Gages ..... Ashcroft; Manning, Maxwell & Moore

Vacuum Gages ..... Ashcroft; Manning, Maxwell & Moore

Manometers ..... Meriam Instrument Co.

Thermometers ..... American; Manning, Maxwell & Moore

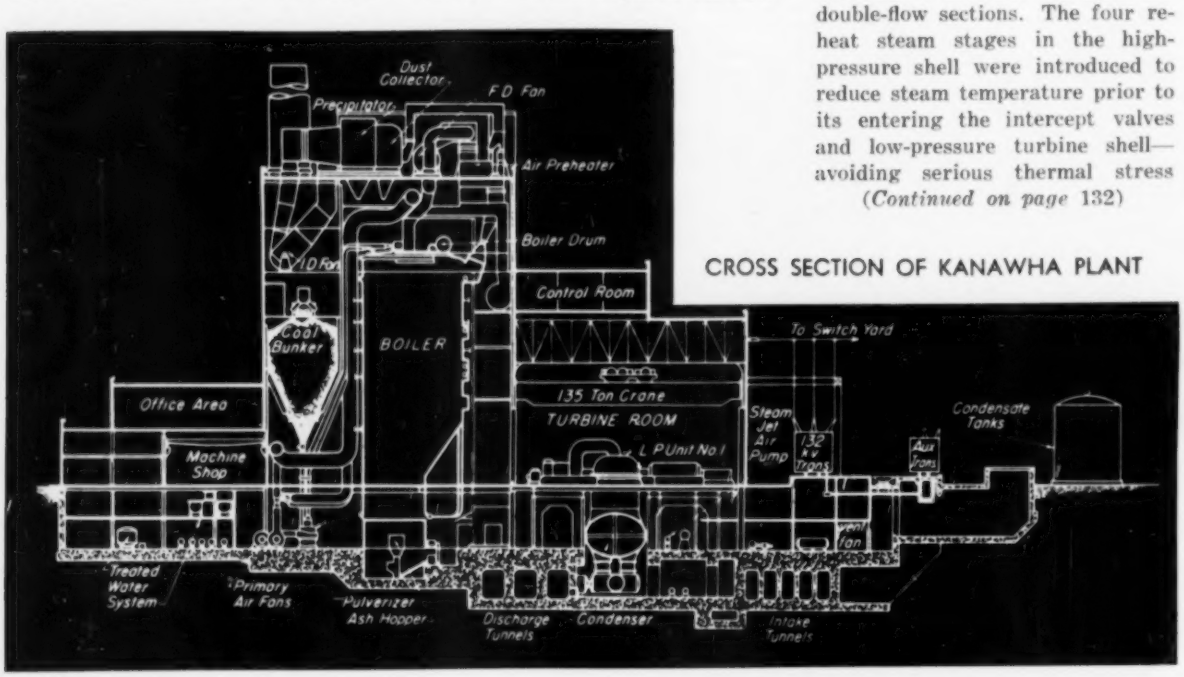
O Recorders ..... Bailey Meter Co.

Conductivity Recorders ..... Leeds & Northrup Co.

then leaves the high-pressure shell through two 24 in. lines and enters the intermediate section through two massive intercept valves. Steam at these valves will be at about 260 psi at full load. Passing through the intercept valve, the steam expands through 16 single-flow stages followed by four double-flow stages.

A large overhead duct forms the cross-over between single and double-flow sections. The four reheat steam stages in the high-pressure shell were introduced to reduce steam temperature prior to its entering the intercept valves and low-pressure turbine shell—avoiding serious thermal stress

(*Continued on page* 132)



CROSS SECTION OF KANAWHA PLANT

Profitable reclamation in Virginia shop . .

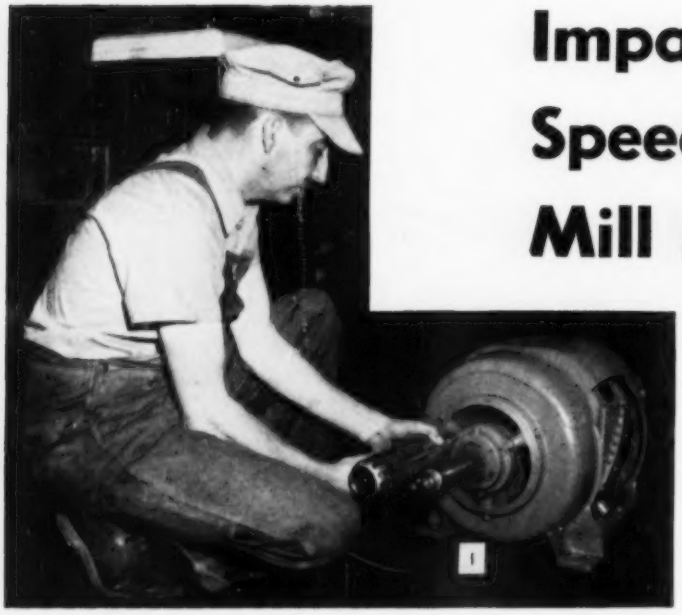
Conveyor Belt System Helps Classify Materials

THE first known application by a U. S. railroad of a rubber conveyor belt for classifying track materials for re-use reclamation, or scrap, has been cutting costs at the Roanoke Maintenance of Way Yard at the Norfolk and Western Railway Company.

How System Operates

The entire materials handling system begins when a crane, equipped with an electro-magnet, lifts the track material from railroad cars onto the belt. The loaded belt passes by a series of 21 bins. At each bin is a workman who tosses into the bin whatever material is to be classified, such as rail joints, tie plates, rail anchors, switch stands, etc. By the time the material has traversed the length of the conveyor, only unsalvageable scrap is left.

CONVEYOR SYSTEM, equipped with a 24 in. wide, 4 ply belt manufactured by the Quaker Rubber Corporation, Division of H. K. Porter Company, Inc., is 700 ft long. Its advantages include doubling the speed of classifying track materials, easier sorting of material, quicker release of freight cars carrying the material into the yard, and greater safety.



Impact Tool Speeds Mill Maintenance

Abney Mills at Anderson, South Carolina, uses four electric tools for drilling, tapping, screwdriving and nut running.

USE of multi-purpose electric Impactools at the Anderson, S. C., cotton mill of Abney Mills, Inc., has speeded mill maintenance and reduced costs. Four Ingersoll-Rand tools, in two sizes, are employed in a wide variety of jobs including installation, modification and repair of production machinery, electrical work, and carpentry.

According to Master Mechanic Joe L. Burriss, each tool is worth an additional man in his maintenance program. That is to say, without the power tools he would need four more men to handle the work now accomplished by his present staff. In addition, the power tools have eliminated much of the fatigue associated with the more arduous jobs, permitting the experienced maintenance men to utilize their skills with less physical strain.

Two of the tools (one 4U and one larger 8U) are normally used in the shop on such jobs as disassembly and assembly of electric motors and repair of mill machinery. One typical shop job is repair of crankshafts for the looms, where the 8U Impactool is used to run the bolts that hold the crown pulley on the shaft.

Management is always in the market for improvements in mill machinery and modification jobs keep the mechanics busy. Recently, the Anderson mill replaced the old spring tops on all the looms with harness top rollers. This involved tapping two holes in each of 2,000 rollers. The 4U tools were used to tap the 4,000 holes of 5/16 in. diameter to a depth of 1¾ in. Time saved on this job alone more than paid for the tools used.

The men and tools move into the production areas of the mill for installation of machinery and many maintenance jobs. One difficult job is the installation of inlaid floor plates with screws that run 5 in. into the heavy floor beams. With hand tool, it took a man four to five minutes to run each screw.

With the Impactool, the job takes less than half a minute. Generally speaking, a man equipped with the power tool doubles his output in the varied jobs performed.

One of the tools is used by the electrician in putting up switches and conduits and in other work. Running conduit along the ceiling used to be a two-man job. One man would hold the conduit in place while the other ran 3 in. screws with a hand screwdriver. The men would take turns running the screws to lessen fatigue. With the power tool, one man does the job and finds it much less tiring. On many jobs, it was necessary first to bore a hole, tap it, then finally run the screw or bolt. The same electric tool, with various fittings,

ILLUSTRATIONS

Fig. 1. Above. The power tool is used often in maintenance of electric motors. Here the mechanic is removing the motor shield to change a bearing.

Fig. 2. Right. The electrician uses an Impactool in strapping conduit. This used to be a hard two-man job, now is done easily by one man.

Fig. 3. The carpenter uses the electric tool for a wide variety of jobs. Here he is building a filling wagon, running a screw ¾ inch through sheet metal and wood.

Fig. 4. The Impactool is used to tap a 5/16-in. hole to a depth of 1¾ in. in a harness top roller. In replacing loom spring tops with these rollers, it was necessary to tap 4,000 holes.

Fig. 5. Out in the mill, the electric tools are used for installation and maintenance of machinery. Here a mechanic tightens a loose nut on a fan bearing.

Fig. 6. The hundreds of electric motors in the mill get some "on the job" maintenance. The electric Impactool speeds the work.

Fig. 7. The Impactool is used to remove bolts that hold the crown gear to the loom crankshaft.

performs all these jobs. The electrician also reports that it is much easier to reach difficult spots in corners or blocked by pipes now that he has the power tool which can be equipped with extension sockets or universal joints.

The fourth Impactool is kept in the carpenter shop where it is used in making wood boxes, ladders, cabinets, battery wagons, filling boxes, work benches, and the like. Again, the work is both speeded and eased so that the carpenter can apply his skill, without fatiguing muscular labor. Since introduction of the power tools in this shop, the carpenter has used many ½ in. lag screws that would be almost impossible to drive by hand.

The men report that the tools are easy to use even in "mass production" jobs like the harness top roller tapping or in difficult locations up on a ladder such as occurs in conduit installation. The 4U tool weighs just 6 lb 8 oz, the 8U, 9 lb, 14 oz. Power is transmitted to the work by swift rotary impacts which eliminate transmission of torque and twist to the handle. The operator merely supports the tool and lets it do the work.

Savannah Electric and Power Company expansion . .

Instrumentation Important Factor

By G. W. WHITMER,
Chief Engineer
Savannah Electric and Power Company
Assisted by C. C. ROBERTS
Minneapolis-Honeywell Regulator Company

INCREASING industrial activity and growing population in the Savannah area has tripled the number of customers of the Savannah Electric and Power Company, which serves this area, and development of the port of Savannah as a state port presages further sharp load increases.

This growth necessitates continual expansion of system capacity. At present, the total generating capacity is 56,500 kw, and tie-line facilities with the Georgia Power Company provide a system capacity of 78,500 kw. An additional 20,000 kw unit is scheduled to be in operation by August 1954.

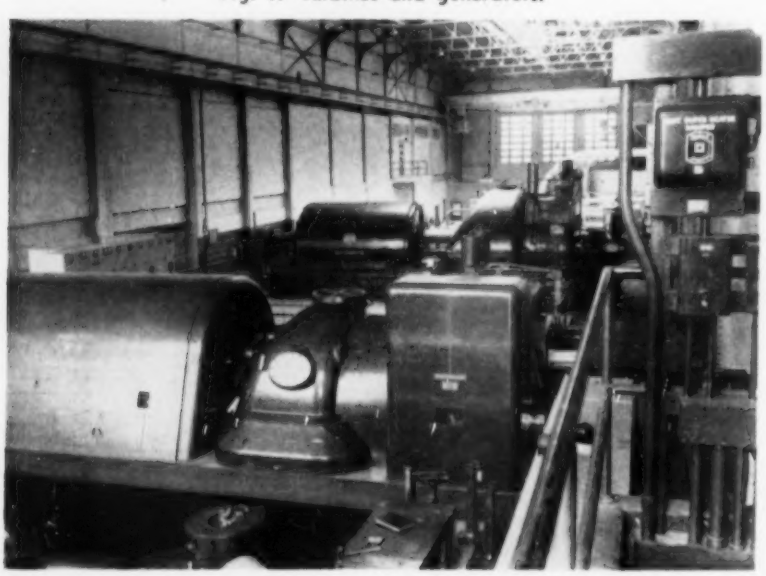
The most recent expansion of generating facilities involved the installation of a 20,000 kw unit at the Riverside Station, and, with each expansion, supervision and operation become increasingly complex. As a result, more supervisory instrumentation is needed.

With more operating factors to observe, control, evaluate and regulate, the task of maintaining optimum operation assumes serious proportions for the smaller generating station undergoing expansion. As a result, it is practically essential to provide automatic recording and signalling for governing boiler operation, turbine and generator operation, and control of the feedwater cycle.

At the Riverside Station present instrumentation provides effective monitoring of all important operating factors. Instrumentation is grouped on three panelboards located in different operating areas, namely, the turbine, pump and boiler panelboards (see illustrations). Inter-instrument and interboard signal circuit wiring (through control switches built into each recorder) are such that an alarm is sounded when important operating conditions deviate beyond high or low limits. Howlers notify operating personnel when something needs correcting. The specific condition at fault is indicated by means of signal lights which identify the measurement that has exceeded permissible limits.

For the most part, electric transmission is employed between the panel-mounted instruments and the sensing units which are located at the points of measurement. This method of transmission is also used to relay measurements to a second instrument when indications are significant at more than one location in the station.

Fig. 1. Turbines and generators.



Multiple Point Recorders

Temperatures important to personnel of the turbo-generating room are indicated and recorded on two Brown ElectroniK strip chart recording potentiometers. These two instruments (which can be seen to the left and right of the turbine panelboard in Fig. 2) incorporate automatic selection of temperature points, recording by characteristic symbol the temperatures of a number of different points. In other words, the recorder to the left provides indications and records of exciter air and hydrogen temperatures—that to the right provides feedwater cycle temperatures.

In sequential operation, the recorder for exciter air and hydrogen temperatures indicates and records the following temperatures on one chart: (1) exciter air in, (2) ex-

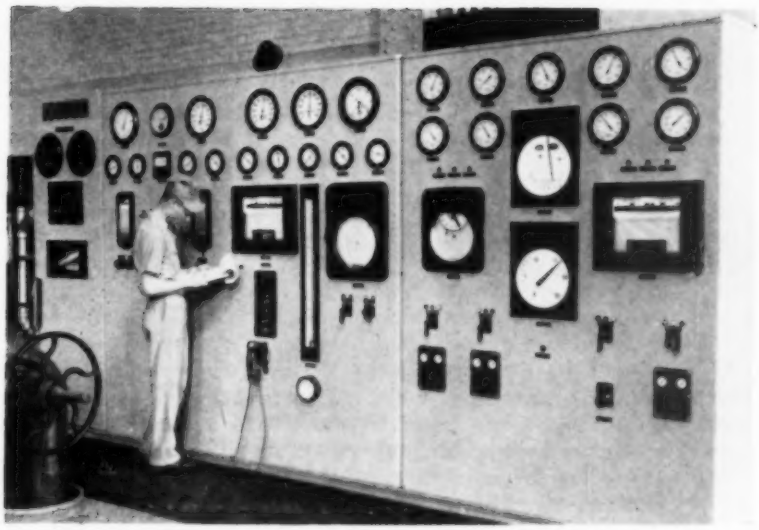
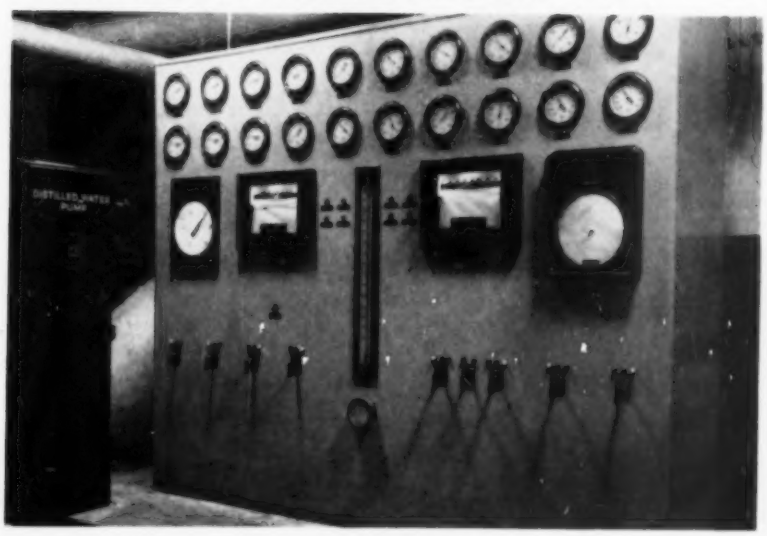


Fig. 2. Turbine-generator panelboard. Operator is checking generator temperatures, which are indicated and recorded on one instrument.

citer air out, (3) hydrogen to Number 1 cooler, (4) hydrogen to Number 2 cooler, (5) hydrogen from Number 1 cooler, (6) hydrogen from Number 2 cooler, (7) generator stator Number 1 and (8) generator stator Number 2. Built into the recorder are control switches which are actuated when any of these records deviate beyond individually pre-set control points. For example, the feedwater temperature recorder provides information concerning the temperature of water out of the various heaters, water out of the evaporator condenser, and water from the deaerator.

In similar fashion, multiple record instruments in other operating boards provide logically grouped records essential to operating personnel in these areas. The two Brown ElectroniK multiple record instruments on the pump operating board (Figure 3) supply operating personnel in this area with essential information. The instrument on the left of the pump panelboard (Figure 3) indicates and records water conductivity in the hot wells. Specifically, this recorder provides a record of water conductivity for the various turbine units (20,000 kw, 7,500 kw, and 15,000 kw units). Measurement is also made at the suction side of the transfer pump for transferred condensates.

Fig. 3. Pump operating board. Level indicator at left duplicates indication of similar instrument on turbine board.



The second strip chart recorder on the pump board provides temperature data on circulating water and condenser hot well water. Four records are provided. They include (1) condenser hot well water temperature, (2) incoming circulating water temperature, (3) temperature of circulating water out (south), and (4) temperature of circulating water out (north).

Evaluation of these factors, as measured by such primary sensing elements as thermocouples, resistance thermometer bulbs, thermal converters and various types of bridge circuits, is provided by the ElectroniK null-balance type instrument (seen in Figures 2 and 3).

Operating on the null-balance principle, the instrument employs a converter, input transformer, electronic amplifier, and balancing motor to continuously balance the known electrical quantity against an unknown quantity.

Mechanical wear is minimized since the balancing motor operates only during a change of the variable. As a result, the instrument requires little maintenance. Vibration and wear, a common scourge of some types of instruments, have little effect on the instrument. Similarly, accurate alignment and careful location are not required. Up to 16 measurements can be recorded on a single chart. As many as eight auxiliary switches each independently set for a certain critical value can be operated in one instrument for the actuation of annunciator contacts for high and low signalling.

Level Indicators

Two Brown inductance bridge indicators (Figure 2) are employed to provide indications of water level. The upper indicator indicates the level in the deaerator. The lower one shows the distilled water level in the outside storage tank. For the convenience of operators in

(*Continued on page* 132)

How improved method paid off for Carolina plant . .

Control of Packaging Materials

A NEW system has reduced packaging materials inventory by 40 per cent for Carol-May Finishing Company—cutting space required for warehousing and reducing capital investment.

The major problem was the storage of boxes for packaging the 12,000 to 14,000 dozen pairs of ladies' hose finished by this company each week. Before the new system was developed, Carol-May had to keep on hand a large enough stock to supply the fluctuating orders of the customers, and the warehouse space required to store boxes of all the various brand names was so great that space had to be rented from one end of town to the other.

Boxes in storage showed a high percentage of waste as a result of damage and age, and the cost of warehouse space and the investment tied up in boxes was excessive.

The basis of the new sytem is *ordering boxes only as they are actually required.* When an order to finish a shipment of hose is received, an order goes to the box manufacturer to make up the boxes

BEFORE Previous to the installation of the new system, such a large number of empty boxes were kept on hand for so long a time that it was almost impossible to avoid this type of storage. Note that wrappings became broken and boxes spilled out onto the floor and were damaged. Because space was at a premium, packages of boxes were stored in the aisles.

AFTER Now, relatively few boxes are kept on hand and they stay in storage only a few days. Steel shelves are used for this temporary storage and they are separated according to brand name. Waste has been reduced and box wraps are always bright and clean. Size and style data are printed on the box ends after packaging the stockings.

required to package the hose, and a delivery date is specified so that the boxes are received on or about the day the hose come out of finishing and are ready to be boxed.

The system worked out by Carol-May assures correct timing and yet is so simple that there is seldom a delay in delivery of finished and packaged hose.

STEP 1 An order is received from a customer to finish a quantity of hose. An office clerk enters pertinent data from the order on a Daily Tabulating Log, showing the number of dozen hose to be finished and the kind of box to be used. The clerk then checks the inventory card to see that necessary "wraps" are on hand at the box manufacturers. If not, the number of wraps to be ordered and the name of the supplying printer is entered on the Log and the purchase order is made and mailed to the printer. An effort is made to maintain a sufficient supply of these printed paper wraps for covering boxes at all times, and a new order is placed before the supply gets too low. The wraps are not a storage problem for they go directly to the box plant from the printer, Carol-May doing nothing more than keeping an inventory and placing orders as needed.

STEP 2 The customer's order then goes to the Order Clerk, who makes up a process order, duplicates it and makes the tickets which accompany the goods through process.

STEP 3 A duplicate of the order goes to the Inventory Control Clerk, whose job it is to make sure boxes and packaging materials will be available when the order is ready for shipment. He first checks his perpetual inventory cards for the minor items such as tissues, folders, and inserts, and deducts the number required for the order from the inventory balance. If any items are thereby reduced below an adopted minimum, an order is placed through the Purchasing Department, and the amount ordered is added to the balance on the inventory card.

The clerk then turns to the inventory of boxes. Since boxes are not "stocked" in quantity, this card will show only a few that were left over as extras from the previous order. Therefore, the clerk immediately places an order for the exact number of boxes needed, and adds this number on his inventory card. When the boxes are actually received from the box maker a few days later, he places a check mark beside the figure in the "Ordered" column, and when the hose have been packed and shipped, he similarly checks the figure in the "Issued" column. At that time he also corrects the number of extras in the balance column.

STEP 4 When the Inventory Clerk's order for boxes is made, a copy goes through the office, and the Office Clerk again goes to the Wrap inventory card and this time deducts from the balance the wraps needed to cover the boxes being ordered.

STEP 5 When materials are received, they are checked against the purchase order by the receiving clerk. He sees that they are in good condition and meet the order specifications. He has the materials stored and reports their receipt to the Inventory Control Clerk. A copy of the receiving slip also goes to the accounting department so invoices may be paid.

Small plant can't always justify elaborate records . . .

ONE CARD Maintenance System at Roanoke Mills—N.C.

By ROBERT J. TUCKER
Plant Engineer, Roanoke Mills Company, Roanoke Rapids, North Carolina

SYSTEMATIC preventive maintenance as a means of reducing production losses is widely employed in large plants where a considerable number of mechanics and supervisors can justify a complete record system to control maintenance operations. The plant employing only one maintenance supervisor and five to fifteen mechanics requires preventive maintenance even more than the large plant, due to its dependence on fewer facilities. But, the small plant cannot justify elaborate records.

One Card System

We have been experimenting with preventive maintenance in three local cotton textile mills for

FRONT SIDE of a typical maintenance card used at Roanoke Mills Company.

ROANOKE MILLS NO. 1

EQUIPMENT MAINTENANCE RECORD

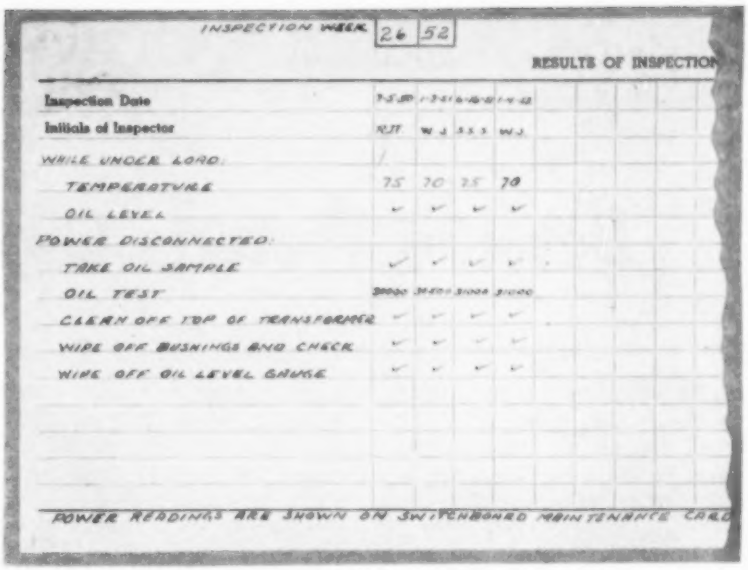
Description: 1000 KVA, SINGLE PHASE G.E. TRANSFORMER, SERIAL NO. 3197117, TYPE H, FORM HSD, 60 CYCLES, VOLTAGE 6900/13200 - 575, POLARITY - SUBTRACTIVE.
SECONDARY BUSHINGS: G.E. TYPE S, FORM DF7, NO. 1106354, 7.5 KV, 2500 AMP, CAT. NO. 282V6
PRIMARY BUSHINGS: G.E. TYPE S 1, FORM C 1, NO. 862125, 15 KV, 15000 VOLTS, 400 AMP, CAT. NO. 411007 G1

MISCELLANEOUS INFORMATION

INSTALLED NEW 1927.
SUBMERGED & OVERTURNED BY FLOOD, AUG. 1940, SECONDARY BUSHINGS BROKEN, WATER ENTERED WINDINGS. NEW SECONDARY BUSHINGS INSTALLED, WINDINGS DRIED BY SHORT CIRCUITING SECONDARY WITH REDUCED PRIMARY VOLTAGE, OIL FILTERED DURING DRYING.
COMPLETE DOBLE INSULATION TESTS DEC. 23, 1948.
REMOVED FROM SERVICE DEC. 2, 1949, TRUCKED TO ELECTRIC MOTOR & REPAIR CO., RALEIGH, N.C., WINDINGS REMOVED, INSPECTED, CLEANED, BAKED, DIPPED, REBAKED & REINSTALLED. OIL RECONDITIONED. GASKETS RENEWED, TANK PAINTED, BUSHINGS CLEANED. REINSTALLED FOR SERVICE FEB. 11, 1950.
OIL TEST SUDDENLY DROPPED TO 14,666 VOLTS JUNE 28, 1950. OIL FILTERED TO 30,000 VOLTS TEST JULY 2, 1950
RECONDITIONED PRIMARY BUSHINGS INSTALLED JULY 5, 1950.
PRIMARY WINDING CONNECTIONS CHANGED FROM 6600 VOLTS TO 13200 VOLTS JULY 5, 1950.

several years. The result is a simple maintenance record which gives very effective results. Only one card is assigned to a machine—no duplicates, and no supplementary forms. The front and back sides of a typical record card are illustrated to show how our system operates. This particular card was selected due to the somewhat interesting maintenance record of the transformer which it describes.

Success of the system depends not on the cards, but on the men making the inspections.



INSPECTION WEEK 26 52

RESULTS OF INSPECTION

Inspection Date	7-5-52	7-21-52	8-2-52	8-17-52								
Initials of Inspector	W.J.	W.J.	S.S.S.	W.J.								
WHILE UNDER LOAD:												
TEMPERATURE	75	70	75	70								
OIL LEVEL	✓	✓	✓	✓								
POWER DISCONNECTED:												
TAKE OIL SAMPLE	✓	✓	✓	✓								
OIL TEST	31000	31000	31000	31000								
CLEAN OFF TOP OF TRANSFORMER	✓	✓	✓	✓								
WIPE OFF BUSHINGS AND CHECK	✓	✓	✓	✓								
WIPE OFF OIL LEVEL GAUGE	✓	✓	✓	✓								

POWER READINGS ARE SHOWN ON SWITCHBOARD MAINTENANCE CARD

INSPECTION RECORD is carried on the back side of the card. System can be enlarged or modified by adding additional cards or by changing frequency and type of instructions.

In general, our preventive maintenance system is applied to the electrical, steam generating, air compressor, and other equipment most necessary to plant production. Also included are motors and equipment installed in remote locations or under severe conditions such as the moisture and fumes of a Dye House basement. These are the units most difficult to replace or repair should a complete failure occur, and in many cases are items also insured by Underwriters against failure. There are not over fifty cards in use for any one mill.

Routine daily maintenance of production machinery such as looms, slashers, spinning frames, etc., is performed by mechanics operating directly under the supervisor responsible for the production from that machinery.

How System Works

The sytem operates on a weekly basis. Each Monday the cards covering equipment to be inspected during that week are carried from Engineering to the mill maintenance supervisor. The cards from the previous week are picked up at that time and returned to the Engineering Department.

The maintenance supervisor distributes the inspection cards to the electricians or mechanics selected to perform the work. The cards are returned to him by the end of the same week if possible. At that time he is verbally advised of any conditions found which need repairs that could not be performed during the inspection. The supervisor immediately notes the work required so as to fit it into his maintenance program.

The same cards used during the inspection are returned to the Engineering Department file to serve as records of the repairs and as reminders when the next inspection becomes due. When the original card is filled with data a second identical card is prepared for use. The original, however, stays in the Engineering file as a permanent record of the past performance of the equipment.

Only brief factual notations are made on the cards. Detailed engineering data is almost always included in correspondence of some type which is kept in the files and is referred to when needed.

The upper front side of the card shows a complete description of the equipment and pertinent data regarding replacement parts. For instance, transformer bushing numbers are snown because they are difficult to obtain with the unit in operation.

The lower front half of the card contains the history of major repairs and changes since the original installation of the equipment

The back side of the card contains the actual record of inspection—the date, inspector's iintials, and work to be performed. The maintenance instructions vary with each piece of equipment. Numbers in the upper margin of the card indicate the weeks during the year by number during which inspections are to be made. The frequency of inspections is varied to fit the conditions.

The card itself is 5 x 8 in. printed on medium weight cardboard having a light brownish color so as to minimize the appearance of dirt picked up while in circulation.

These cards serve as a simple means of scheduling maintenance inspections, noting what conditions were found, and indicating when these conditions are corrected.

Our system can very easily be enlarged or modified by adding additional cards or by changing the frequency and type of inspections. Like any other system, the secret of success lies in the men making the inspections, not the cards. We constantly strive to emphasize the importance of correcting a condition before it becomes serious. Each year the results are better than the year before. In time, preventive maintenance will pay off in real savings in our mills.

Tramp metal detected in Alabama mill's wood waste . .

Detector Protects Chipper Knives

AS a safeguard against damage to chipper knives by tramp metal, the W. T. Smith Lumber Co., Chapman, Alabama, has installed an Allis-Chalmers metal detector on its production lines to inspect wood waste traveling to chipper equipment.

The detector is successfully protecting the lumber company's chipper from an assortment of tramp metal including nails, steel gear and hand tools. In addition, the production down-time normally experienced when equipment is damaged by tramp metal, has been practically eliminated. The lumber firm's technical representatives expect the metal detector to pay for itself in about four months of operation.

Detector Installation

The metal detector installed at the W. T. Smith Lumber Co. has a special aperture height of 16 in. to accommodate the various sizes of wooden slabs, edgings and trimmings that must be inspected for tramp metal. It is mounted on an inclined conveyor system that carries wood scrap to the chipping machine.

Vibration Controlled

An eight-foot section of the all-steel conveyor system was removed and replaced with a wooden structure. The metal detector was then mounted in a horizontal position encircling this wooden portion of the conveyor system. By securely bolting the detector to rigid wooden beams, the amount of vibration normally present from the chipper operation was materially reduced and proved not to be a problem with respect to the stable operation of the unit.

A 24 in. wide conveyor belt running at approximately 200 fpm carries the wood waste through the inspection aperture. This waste wood, which is dumped on the conveyor belt, is sometimes carried along in a tangled mass with pieces extending to a height greater than that of the aperture opening. To protect the metal detector from damage by excessively high piles as they move by, a wooden leveling timber was installed 12 in. ahead of the detector.

Operation

When metal is detected on the conveyor, a relay is energized and the conveyor belt stopped to allow removal of the metal. Resetting the metal detector and starting the conveyor system is accomplished by means of a pushbutton station. The detector is one of the first of its kind installed for use by the lumber industry.

CHIPPER KNIFE (below) was seriously damaged by the pieces of tramp metal. Production down-time and high cost of maintenance and replacement have been eliminated with the Allis-Chalmers metal detector at the right. Wooden leveling timber on conveyor protects detector.

Lower fuel costs—less maintenance for Teague, Texas . .

Diesel to Dual-Fuel Operation

RELIABLE service, free from maintenance troubles is important for both prime movers and accessory equipment, but low operating cost is equally important to Mr. J. E. Lambert, Manager of Utilities for the City of Teague, Texas. Striking changes were wrought in this respect when the switch was made from diesel to dual-fuel operation.

Increased fuel costs added to the fact that the existing city plant was rapidly getting full of small engines called for extensive changes.

August, 1952, marked the putting into service of a 960 hp, Model 38 DD8⅛, 8⅛ x 10-in., 6 cylinder, Fairbanks-Morse, opposed-piston, dual-fuel engine. At this same period the physical plant was extensively remodeled and a new electrical switchboard was installed.

The engine operates at 720 rpm and is direct-connected to a 675 kw, Fairbanks-Morse generator with a belt-driven exciter. An engine control and alarm panel is located near the blower end of the engine.

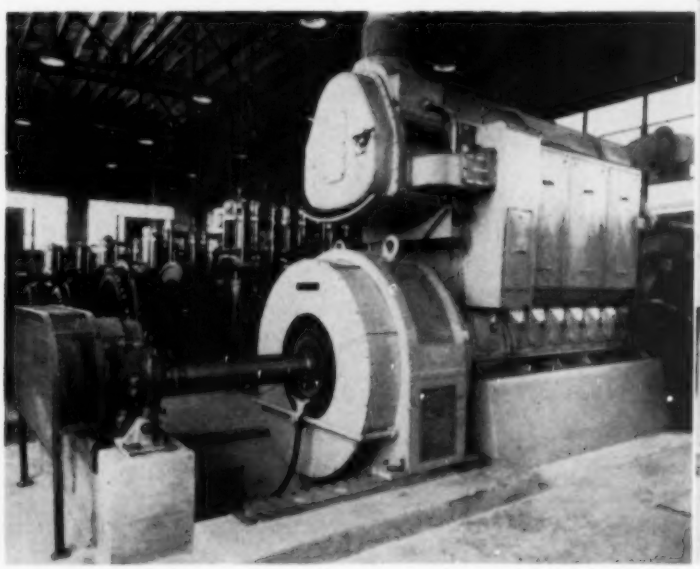
The opposed piston, dual-fuel engine, resulting in the sudden reduc-

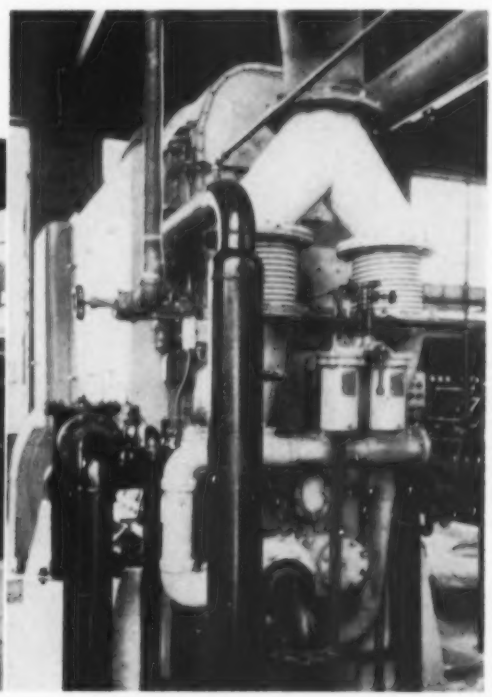
(*Continued on page* 131)

Equipment Listing—City of Teague, Texas

Engine .....Model 38 D 8⅛, 960 hp, OP, 2-cycle, 6-cylinder, 720 rpm, Fairbanks, Morse & Co.
Generator ..... 675 kw, Fairbanks, Morse & Co.
Exciter .....Belt-driven, Fairbanks, Morse & Co.
Fuel pump ..... Engine-driven, Fairbanks, Morse & Co.
Fuel oil filter.....William W. Nugent & Co.
Fuel oil .....Commercial Oil and Refining Co.
Gas fuel .....Lone Star Gas Co.
Starting air tanks.....Fairbanks, Morse & Co.
Lubricating oil .....DTE No. 3, Magnolia Petroleum Co.
Lubricating oil pump ..... Engine-driven, Geo. D. Roper Co.
Before operation pump .....Geo. D. Roper Co.
Heat exchangers (water and oil) .....Kewanee-Ross Corp.
Lubricating oil filter .....Fairbanks, Morse & Co.
Exhaust silencer .....Maxim Silencer Co.
Intake air filter.....Cycloil, American Air Filter Co.
Raw water pump ..... Fairbanks, Morse & Co.
Jacket water pump.....Fairbanks, Morse & Co.
Exhaust pyrometer .....Alnor, Illinois Testing Laboratories Inc.
Gauges .....Fairbanks, Morse & Co.
All motors for pump drives...Fairbanks, Morse & Co.
Switchboard .....General Electric Co.

DUAL FUEL ENGINE (Fairbanks-Morse) has carried the bulk of the load and cut plant fuel costs in half since August, 1952. Exhaust header, Nugent fuel filter and Woodward governor are shown at the right.





Top management actively participates . . .

ORIENTATION TREND Shows What Makes Lion Oil Tick

NINETEEN Lion Oil Company employees, engaged in supervisory or technical work and representing eleven departments in the Company, gathered in a conference room in El Dorado, Arkansas, early in January, 1953, to begin a 15-day study course. Another group met in April, a third group in July, and another in October.

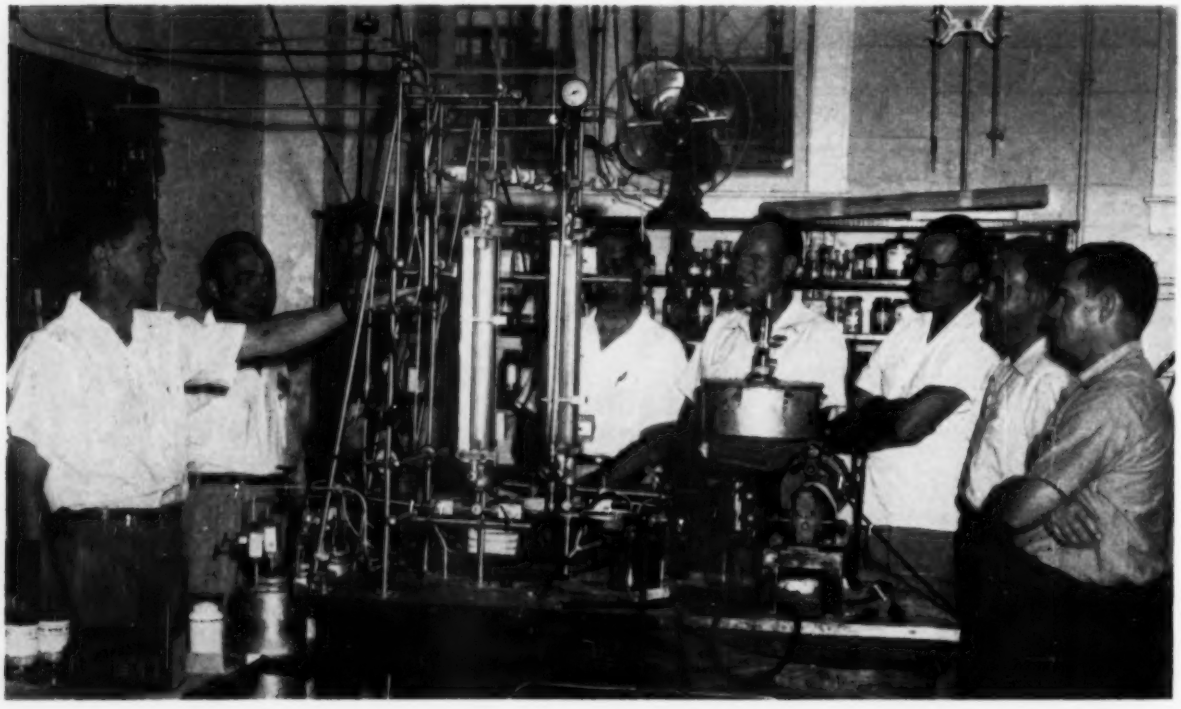
These four groups represented the first year's operation in Lion Oil Company's new Orientation Program designed to give each employee a better understanding and overall picture of his company and its many operations—including the functions of all departments and the relationships between the departments. Orientees also became better acquainted with the more than 60 Lion products through explanations of their development, distribution and use.

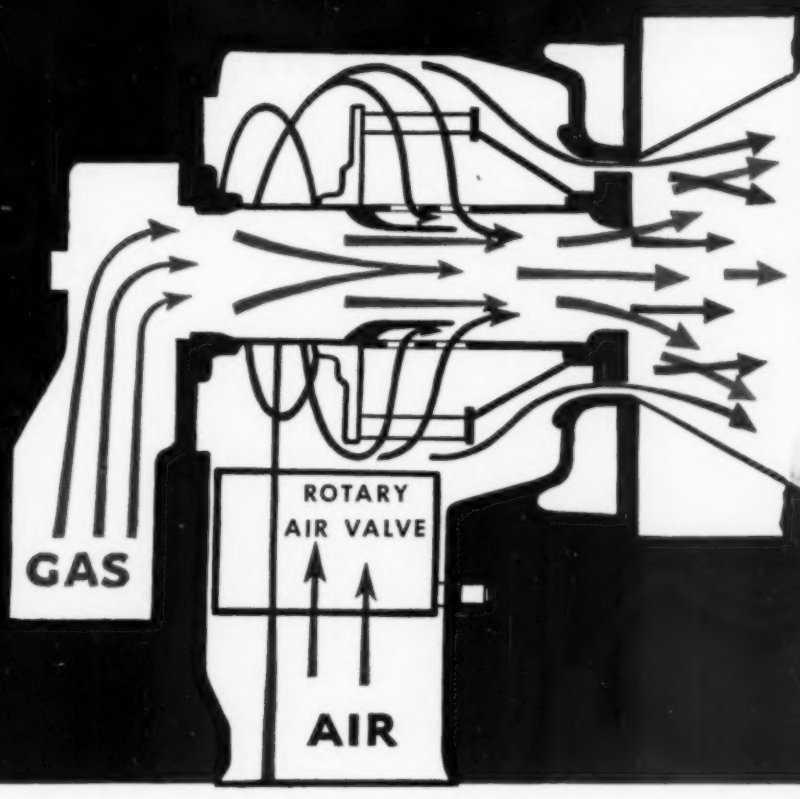
Lion Oil's orientation program is unique in that it was originated by a resolution of the Board of Directors, and because top management actively participates. The first topic in each course—"Management"—is led by Lion President T. M. Martin, who presents historical background of the Company, its organization structure, general problems of the day and a brief outline of the Company's future plans.

The orientation course, for the first three quarterly programs, ran 15 consecutive working days. The experience gained in the first three series of conferences revealed that the program could be improved by streamlining the

(Continued on page 131)

CLASSROOM SESSION in Lion Oil Company's orientation program. Dr. Leo J. Spillane, research group leader (extreme left), explains the workings of a piece of apparatus in the research laboratories to a portion of the third orientation group.





another cost-saving feature of POWERMASTER packaged automatic boilers!

The VORIFLOW® Gas Burner

Keeps fuel costs DOWN ... boiler efficiency UP

You can always depend on getting highly efficient and economical gas-firing with a Powermaster packaged automatic boiler because the Powermaster VORIFLOW gas burner gives you these operating advantages:

1. Infinitely Variable Combustion Modulation

Fully automatic control of fuel and combustion air responds instantly to load demands ranging from 20% to 100% of firing capacity—*with full efficiency!* There's no fuel-wasting combustion with the VORIFLOW gas burner because properly proportioned fuel and air are thoroughly pre-mixed to insure immediate ignition and complete burning upon entering the combustion chamber. All components of this unique burner are carefully sized for the Btu content of the gas supply and the heat requirements of the boiler.

2. High Efficiency Design and Construction

In the VORIFLOW burner, gas flows through the central gas nozzle from the gas plenum. Combustion air from the blower enters the air plenum, proportioned automatically by the motor operated rotary air valve. Primary pre-mixing air is captured by a stationary compressor wheel. This assembly directs the pre-mixing air through perforations into the gas nozzle against venturi-shaped air baffles. The gas and air are thoroughly mixed enroute through the gas nozzle. The outer air ring controls the amount of secondary combustion air admitted to the combustion chamber.

3. Immediate Change-Over to Alternate Fuels

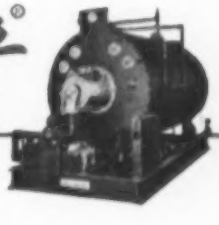
Conversion from gas to oil firing, or vice versa, with this VORIFLOW burner is accomplished in a few seconds on combination units. With the flick of an electric switch, the Powermaster modulating firing controls go into action as soon as the fuel change-over is completed. Latest development for gas firing of packaged boilers, this VORIFLOW burner is one of many reasons why Powermaster is so widely preferred for industrial plants, dairies, hospitals, laundries, schools, public buildings, institutions, and other steam and hot water boiler requirements.

Send for this new bulletin to get the full story of Powermaster's many cost-saving features.

Powermaster®

PACKAGED AUTOMATIC BOILERS

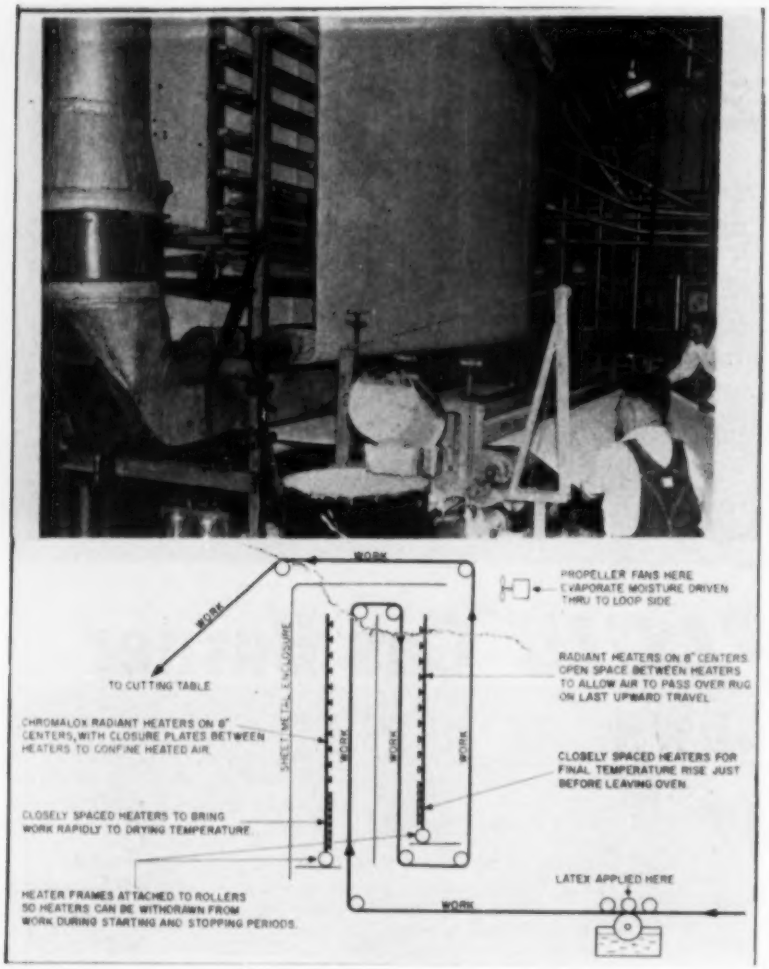
In sizes to 500 HP; pressures to 250 psi.



ORR & SEMBOWER, INC. • Established 1885 • **910 Morgantown Road, Reading, Penna.**

HELPING the *MAN-IN-THE-PLANT*

ideas . . . tools . . . methods . . . devices


WORK
WORK
TO CUTTING TABLE
CHROMALOX RADIANT HEATERS ON 8" CENTERS, WITH CLOSURE PLATES BETWEEN HEATERS TO CONFINE HEATED AIR.
CLOSELY SPACED HEATERS TO BRING WORK RAPIDLY TO DRYING TEMPERATURE.
HEATER FRAMES ATTACHED TO ROLLERS SO HEATERS CAN BE WITHDRAWN FROM WORK DURING STARTING AND STOPPING PERIODS.
SHEET METAL ENCLOSURE
WORK
WORK
WORK
PROPELLER FANS HERE EVAPORATE MOISTURE DRIVEN THRU TO LOOP SIDE
RADIANT HEATERS ON 8" CENTERS OPEN SPACE BETWEEN HEATERS TO ALLOW AIR TO PASS OVER RUG ON LAST UPWARD TRAVEL
CLOSELY SPACED HEATERS FOR FINAL TEMPERATURE RISE JUST BEFORE LEAVING OVEN
LATEX APPLIED HERE
WORK

Radiant Oven for Drying Latex

THE Patcraft Rug Mill, Dalton, Georgia, applies liquid latex by roller to the backs of cotton loop rugs to anchor the ends of the yarn and to provide anti-skid properties. The latex must be dried and cured rapidly so that rugs may be cut to size and sent to laundry for dyeing and finishing.

A vertical radiant oven was constructed with two banks of Chromalox radiant heaters. The work passes vertically over rollers so that heat is applied to the latex coated side as the material goes upward and again as the material passes downward through the oven. Heaters overlap at the center to form a uniform, unbroken band of heat across the oven. The heaters are mounted on frames attached to rollers so that the assembly can be withdrawn from the work during starting and stopping periods.

Controlled ventilation bleeds off a portion of the moisture laden air and recirculates warm air to the bottom of the oven to speed evaporation. The speed of the material is varied to make full use of the heat available. The vertical oven requires a minimum of floor space for 30 ft travel through the heated zone, and drying is uniform over the entire width of the cloth.

$$$ For Your Ideas

Send your plant-tested ideas, methods and short-cuts to SP&I. Payment is made for suitable material—a photo or rough sketch will make your idea more valuable.

How-to-do-it items from maintenance and production men in Southern and Southwestern plants are preferred. Material must not have appeared elsewhere nor been sent to another publication.

Water Well Acidizing

A NEW technique in water well acidizing has been reported by Dowell Incorporated, Tulsa, Oklahoma. The following is a summary of the chemicals and procedures used, and the results obtained on a water well treatment for a large manufacturing company in northern Florida.

Two types of chemical solvents were employed. The first solvent was 15% inhibited hydrochloric acid containing a stabilizing agent to prevent the precipitation of iron from the spent acid. The second solvent was a 15% inhibited hydrochloric acid solution containing an agent designed to have an etching effect on the walls of fractures or other formation openings, and to assist the acid in the removal of mud, silicates and

GULFCREST is the right oil for every steam turbine

Westinghouse 95,000 KW turbine generator recently installed at the Elrama generating station of the Duquesne Light Company near Pittsburgh, Pa. The turbine lubricating system was flushed with Gulf Turbine Flushing Oil, then filled with Gulfcrest—the worlds' finest turbine oil. This prominent utility selected Gulfcrest Oil on the basis of previous successful experience.

the right base stock, Alchlor processed
the right combination and concentration of additives
the right background of performance

Gulfcrest Oil has a background of successful performance in every type and make of steam turbo-generator.

In many of these installations the original charge of Gulfcrest has been in service more than 10 years with no significant change in its original characteristics, and with neutralization numbers always remarkably low and safe.

To get this kind of lubrication for your turbine, call in a Gulf Sales Engineer and ask him to recommend the proper grade of this superior oil. Write, wire, or phone your nearest Gulf office today.

Gulf Oil Corporation
Gulf Refining Company
Pittsburgh 30, Pa.

GULF SERVES INDUSTRY

feldspar materials. It is also designed to act as a retarded acid, achieving greater penetration before becoming spent. This latter solvent has been in use for some time in oil field acidizing where it is referred to as Etching Acid.

Procedure

The actual acidizing operation on this water well proceeded as follows: A first stage of 1000 gallons of 15% inhibited acid was pumped slowly down the well casing, followed by a fresh water flush equivalent to the casing volume plus 1000 gallons.

Following displacement of the acid the well was closed in for one hour, and then pumped until all the spent acid was removed. The purpose of this stage was to dissolve and remove any iron sulphide deposits from the casing surfaces, and clean up the exposed formation just below the casing seat.

The second stage consisted of 5500 gallons of Etching Acid which was introduced into the well at a much faster pumping rate than that used in the first stage. The Etching Acid was followed by a fresh water flush equivalent to the casing volume plus 6000 gallons. After a one hour shut-in period, the well was pumped until the spent acid solution was removed.

Prior to acidizing this well it was necessary to restrict the tubing flow to 695 gpm in order to maintain the prime of the pump. After chemical service the well pumped 2600 gpm continuously against the system with a five foot head at the pump suction.

Photo shows how the Arnold Stone Company, Greensboro, N. C., uses woven wire slings for handling cast concrete structural members. Gripper slings, manufactured by the Cambridge Wire Cloth Company, are applied in transporting precast items by monorail crane.

Woven Wire Slings Handle Heavy Abrasive Items in N. C. Plant

THE major problem in the selection of the type of sling to be used for handling pre-cast concrete building shapes is the extremely abrasive condition of the castings. Since pre-cast concrete building shapes are extremely heavy and offer a combination of both abrasive flat surfaces and sharp edges, it is necessary to choose a type of sling that can withstand the abrasion and weight combination.

The Arnold Stone Company, of Greensboro, North Carolina, is using woven wire slings for handling such items as joists, column struts, and large lintels. When the concrete in the molds for these pieces has hardened, the hardened form is shaken out of the mold. At this point the woven wire slings are used to move the completed piece from the shake-out station to the point where the forms are filled and rubbed down. From this point, other slings are used to move the forms out of the plant and into storage areas.

As illustrated, Arnold Stone uses short lengths of woven wire slings suspended at either end of a spreader bar which in turn is suspended from an overhead monorail hoist. The woven wire slings are used in a basket hitch, that is, with both handles on the hook, to gain use of the maximum strength of the sling. The other method of using this type of sling is in what is called a choke hitch; with the male handle passed through the female handle and attached to the lifting hook. This hitch gives the user the benefit of maximum gripping power since the sling bends entirely around the circumference of the load.

3000 impulses help keep mid-west refinery "on stream"

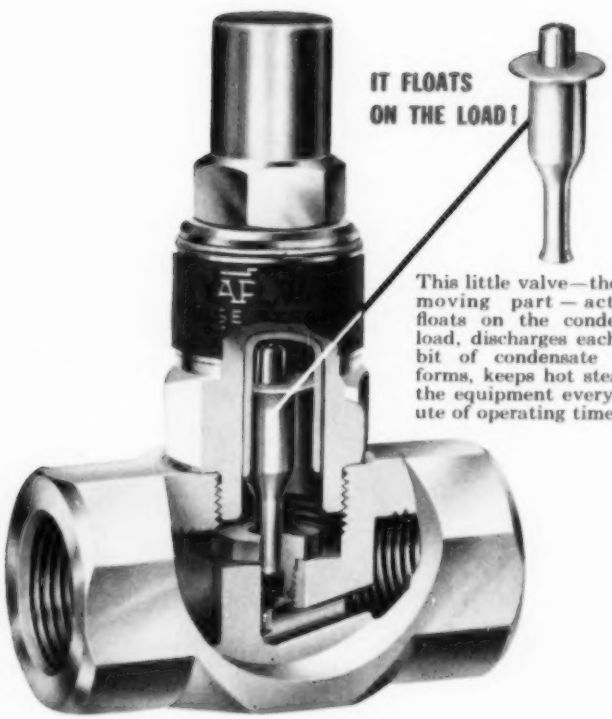
THIS big refinery at Lawrenceville, Ill.—like a lot of other important refineries — uses Yarway Impulse Steam Traps.

Over 3000 Yarway Impulse Traps are installed on tracer lines and for draining steam headers.

Popular features of the Yarway Impulse Steam Trap are its ability to get equipment *hot in a hurry*—and keep it hot! . . . also its small, handy size—fits in easily in any location; its stainless steel body and working parts; quick installation; easy maintenance; low initial cost.

Another advantage—IMMEDIATE DELIVERY from 250 local distributors, plus quick service from nearby Yarway field engineers.

More than 900,000 Yarway Impulse Steam Traps have been sold. For a free Steam Trap Selector, write . . .



This little valve—the only moving part—actually floats on the condensate load, discharges each tiny bit of condensate as it forms, keeps hot steam in the equipment every minute of operating time.

YARNALL-WARING COMPANY
Home Office: 116 Mermaid Ave., Philadelphia 18, Pa.
Southern Representative:
ROGER A. MARTIN, Bona Allen Building, Atlanta 3, Ga.

YARWAY®
impulse®
steam trap

Grounding? What Does It Imply

Comments by Paul C. Ziemke, Oak Ridge, Tennessee

THERE IS ALWAYS just a bit of cautious raising of the eyebrows among electricians as the term "grounded" is used. The word means a different condition to different people.

Most frequently the term grounded means that the metal frame of motor, transformer or other electrical device is energized by reason of a fault in the insulation which permits the device to have its frame at line potential. Not a safe condition in any man's language.

The second expression grounding means that the frame, or one leg of the circuit, is tied to earth by some recognized and permanent means. The word "earth" is used advisedly.

An average motor running in dry surroundings and perhaps encircled by a wood floor may run with a line potential on the frame for years without causing the slightest tingle to anyone touching it. But, if we have this motor's wires running in conduit we have a conducting medium—from motor frame to earth. Now if one leg of the motor circuit is tied to earth through the fault in the insulation and if a second insulation failure occurs anywhere on that circuit a line fuse will rupture. With this in mind we make sure that we tie our conduit to a low resistance connection to earth, for instance the building's water main.

And, if we wish to make doubly sure, we may even pull a separate bare wire in with the three insulated line wires to be very sure that we have a good conducting path to earth. Then we make sure that at no point do we have our 3 phase current suffering from faulty insulation and we know we shall be trouble free for a long time.

There is an exception to this rule when we work with the common 230-115 volt ac circuit. This circuit is special in that it normally serves only for lighting and appliance power, and being of single phase origin it has no real qualifications for heavy motor work. Though single phase it is quite universally transmitted on three wires. Two connections to earth are required—one at the substation or transformer pole and the second at the load usage center where connection is to water main or driven ground rods. This pair of earth connections is to the middle tap on the secondary of the transformer, a wire universally known to the trade as *neutral*.

Being tied to earth it is now both neutral and "earthed."

In keeping with its nomenclature the neutral wire is colored white by white insulation and the two companion line wires are identified with black insulation. The latter two are the "hot" wires and are at 115 volts potential to the neutral or earth. The voltage between the two energized wires (black) is 230 volts.

There is real advantage in this technique in that in the average two wire circuit in home or plant we now have reduced our capacity for shock hazard to personnel by 50 per cent, the average lamp or appliance having but two wires attached, one of which is the neutral and the other the hot wire. Should this energized wire make contact with household plumbing, steam or hot water radiators or the warm air heating louvers through the medium of faulty insulation in an electric drill or other appliance, the short path to earth is used by the by-passing or fault current. The fuse is "blown" or the circuit breaker is tripped and the offending circuit is dead until the trouble is cleared.

This short path to earth is useful in still another field of electrical wiring. The fact of making one wire free of potential through

Note that the lady machinist is protected by an all metal lamp for point of operations lighting and her lathe motors are powered through Code approved flexible conduit, or Greenfield tubing.

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its connection to earth insures a short path for all foreign currents that may be impressed on the normal 115 volt circuit by accidental crossing with wires of other potentials, and probably high ones. Lightning strokes are shunted to earth in jig time and any faulty operation of transformers where high potential primary current is fed to secondary circuits is neatly taken care of by a relatively short, low resistance path to earth.

It is fairly common to find some misunderstanding between wiremen on the two terms—grounding conductors, and grounded neutral conductors, and about the Code rules regulating circuit grounding, the grounding of conduit and high voltage equipment enclosures.

Tying the system to earth is highly proper on a-c systems and is best achieved by the connection of the service neutral along with the grounding wire directly to the switch case; also, by banding the service conduits and raceway to this junction point. Then on a short circuit to earth we have at least two ideal short paths for the offending current to follow.

Example

On one job the service and ground leads were brought into a meter and switch combination box, the service continuing to the remote indoor circuit breaker cabinet wherein the "ground" screw had not been made even "finger tight." This left the neutral junction plate actually "insulated" from earth. Faulty insulation in the circuit breaker cabinet caused metal parts to be energized and forced current out over the connected maze of armored cable (B X) to whatever casual contacts this armor made with ground. The result was the creation of a rare, but in this case expensive, "hot armor fire." The moral here is—make all connections tight and bright for good, low resistance conductivity.

Applications

All convenience outlets in basements, boiler rooms, laundries and other wet locations should be of the three wire, polarized type. This also applies to the outlet serving the yard where the electric lawn mower, the trouble lamp for work on the car, or the line to the Japanese lanterns at the lawn party is energized. This three wire precaution will insure you a return path for all fault currents that may raise the metal of your appliance to 115 volts above neutral potential. The green wire will be continuous for that service, the black wire is the lead that is wired through the switch so that when the switch is "off" the current is really isolated, and the white neutral wire is provided to carry the line current back to the meter.

$$$ For Your Ideas

Send your plant-tested ideas, methods and short-cuts to SP&I. Payment is made for suitable material—a photo or rough sketch will make your idea more valuable.

How-to-do-it items from maintenance and production men in Southern and Southwestern plants are preferred. Material must not have appeared elsewhere nor been sent to another publication.

Southern Power & Industry
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Keeping these colored wires connected properly is termed "polarizing" in the vernacular of the wireman. He never places a switch in the neutral wire since it carries no potential, but he does place it in the black (hot) wire circuit so that the potential is cut off as the user intended. And he sees to it that the green wire is kept continuous from appliance frame to receptacle in the wall to insure a short, zippy path for the deadly fault current when insulation ruptures or burns through.

In making connections to multi-wired receptacles, note that the manufacturers have complied with the Code by identifying the three binding screws. The hot wire screw is identified by the brass finish and its companion wire is black. The tin plated screw, of course, corresponds to the white neutral wire, and the ground screw is actually stamped "gr" for the guidance of the wireman. The green wire is attached there.

In no instance should "jumpers" be wired across the back of the receptacle from the "gr" screw to the neutral screw in an attempt to compromise a makeshift three wire cord arrangement. This is especially true where the receptacle is mounted on a grounded metal box. It is best to keep the neutral wire and the ground lead separate for the complete secondary network up to the main switch. By such segregation the neutral serves only as one-half of the two wire energized circuit, as it should be. And, the ground wire, or the metallic conduit in combination with the ground wire, carries the fault current only as it should according to plan. In no instance should normal line current flow over ground wire circuits. That is the function of the neutral wire.

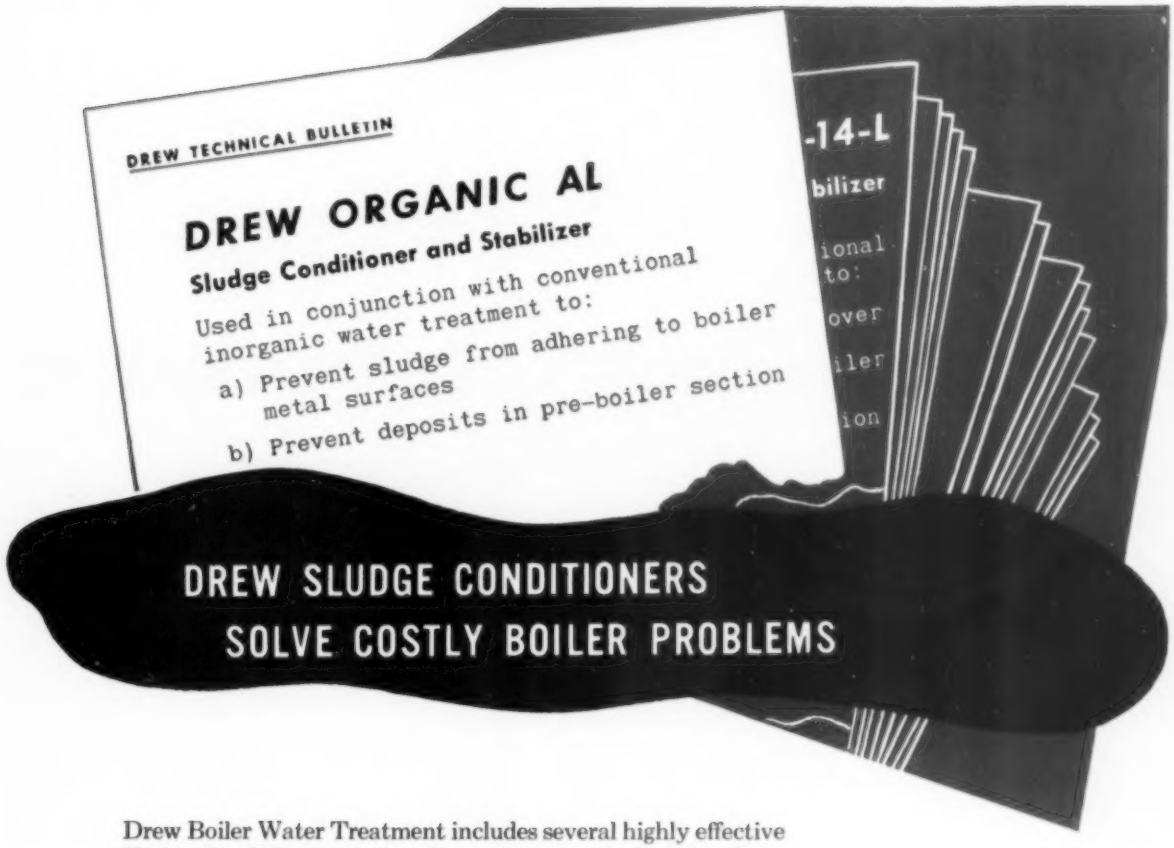
Warning

Watch out for the wireman who uses the conventional three wire polarized receptacle for use as an outlet for three phase current supply. In the vast majority of instances, this three phase current has no grounded neutral leg. You may readily imagine what happens to the victim when he plugs his frame grounded appliance into such a receptacle. The frame, the ground wire in the cord, and the human being are all energized at whichever potential is connected to the "gr" post of the receptacle.

Braided lamp cord of the familiar green and yellow color combination has a red thread in the textile cover of one conductor. Failing to note the importance of that red thread has electrocuted some persons when they failed to realize that "NEVER" must the shell or threaded ferrule part of the socket be connected to the energized wire. Remember the rule about the switch in the hot leg only.

People have been killed as they reached up to remove or place a

(Continued on page 130)



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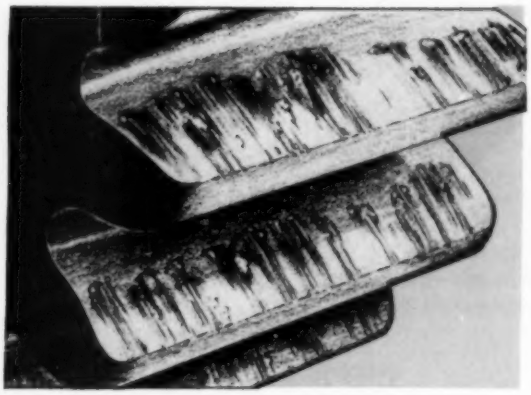
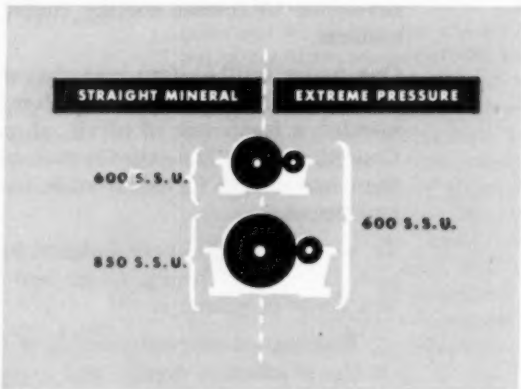
Gulf E. P. Lubricants have proven ability to protect gear teeth against damage by scoring and welding. They are specially compounded to provide extra film strength and to prevent metal-to-metal contact under most conditions of overload and shock load. That's why you can usually avoid tooth damage like that shown at the right when you use Gulf E. P. Lubricants. And that's why they provide an extra margin of protection when production demands approach or exceed the rated capacity of the equipment.



2 **Fewer lubricant grades needed— lubricant storage and handling simplified**

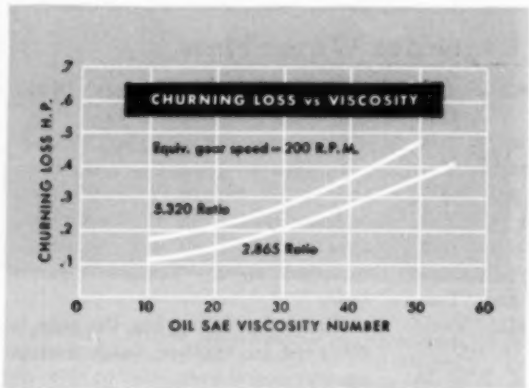
Because Gulf E. P. Lubricants have superior film strength, it is often feasible to use a lower viscosity grade than would be possible with a straight mineral oil. This is a practical advantage for plants operating several different types of gear drives. If, as pictured at the right, two straight mineral oils of different viscosity are specified, one grade of Gulf E. P. Lubricant may well do the job of both. Thus lubricant storage and handling is simplified, and there is less chance for confusion in the oil house.



Gulf E. P. Lubricants are available in the proper viscosity for every gear requirement, ranging from 55 to 1000 SUV at 210 deg. F. For specific recommendations for your equipment, call in a Gulf Sales Engineer. Write, wire, or phone your nearest Gulf office, or send the coupon.

for enclosed gear drives

of these practical advantages:



3 Reduced power loss caused by churning in splash-lubricated units — lower power costs

There is another advantage in using a lower viscosity oil in splash-lubricated units where power loss due to churning is appreciable. Since this loss is almost directly related to oil viscosity, the use of lighter Gulf E. P. Lubricants often means reduced heat generation and lower power costs.

The chart at the left shows the effect of viscosity on the churning loss in horsepower of a typical gear unit.

4 Excellent protection against rust

The ability to protect polished gear teeth and antifriction bearings against rust is an important property of a gear lubricant, and is essential in a lubricant for units which are occasionally idle.

Gulf E. P. Lubricants have highly effective rust preventive properties—insure against excessive wear and enlarged tolerances which might result from the presence of abrasive rust particles.

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- ☐ Please send me a copy of your pamphlet "Gulf E.P. Lubricants for Reduction Gear Drives."
- ☐ Please arrange to show a group in our plant the new Gulf Color Slide Film, "Gears and Their Lubrication," Part I.

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Die Cleaning Method

DIMPLE die cleaning has been shortened from an eight-hour-a-week undertaking to an easy 10-minute job at Temco Aircraft Corporation, Dallas, Texas.

Dies not only clean quicker with a new bathing process, but they clean better and less expensively, and they last longer.

Abrasives had been used to grind aluminum burrs, burned grease and paint off of chromed die faces. Some of this foreign matter melts in the 600-degree heat associated with dimpling operations, and the melted and burred matter cakes particularly around the base of the die cone. This, in turn, ruins die configuration and causes marred or mis-shaped dimples.

Grinding cleaned off the melted matter satisfactorily, though the system required a man-hour a day on the average. But abrasives often did more damage to die configuration than the melted matter caused.

Abrasive stones didn't fit the tiny contours of die faces. Dies came out of chucks after grinding with dished-out cones and lopsided spring-back angles. An estimated one-fifth of dimple dies used were discarded because of abrasive wear and tear.

Bathing Process

Then D. R. Gates, hot dimpler in Temco's A2D center wing department, asked why not bathe instead of grind dies clean. After some research, he developed this system.

Mix caustic soda and water at a cup-to-a-gallon ratio. Heat the mixture to 200 F in a glass or steel container on a hot plate. Drop dirty dies in the mixture, and two to 10 minutes later, take them out. Rinse them in plain water and dry with a rag, and they look and work as good as new.

Gates uses an iron or steel basket to dip dies in and out of soda solution. He adds that anyone using his system should use care in handling the cleansing soda.

Star Drill Guard

THIS guard for a star drill was designed by a maintenance man in Du Pont's Belle Works, Belle, West Virginia, to eliminate flying dirt or chips.

It consists of a suction cup from a "plumber's helper" and two cellulose sponges, which are fastened to the bit with a spring collar and setscrew. The springs are in sections and can be adjusted to fit the length of any bit. The sponges may be dampened with water to help prevent fires and keep down dust, at the same time eliminating the use of a wet rag or hose.

Drive Regulates Water Flow

WHEN additional water flow was required for pulpwood logs floated by flume from a railroad siding to its Covington, Va., mill, West Virginia Pulp and Paper Company recently placed in operation a second booster station comprised of two propeller-type pumps, 60 hp induction motors, and "Texrope" drives with automatic "Vari-Pitch" sheaves.

The drive consists of 9.75 to 18.0 in. pitch diameter, 3-groove, T-section "Vari-Pitch" sheaves and 3-groove, T-section companion sheaves. They connect two Allis-Chalmers 60 hp induction motors to 5⅛ to 1 ratio gear reducers which drive the 48 in. pumps and maintain required variable flow of water in the flume to regulate the conveying speed of the logs.

Pump speed is controlled by moving the motor toward or away from the driven sheave. This is easily accomplished while the drive is in operation because the motor is mounted on a "Texslide" motor base.

Water for conveying the logs is returned in another flume and is used over and over.

This propeller-type pump, 60 hp induction motor and "Texrope" drive with automatic "Vari-Pitch" sheave is one of two such units recently installed on a flume at West Virginia Pulp and Paper Company, Covington, Va., to furnish additional water flow. The drive provides the required variable speed to regulate the flow of water in the flume, thus altering the conveying speed of the logs.

Another specific reason why it's Kellogg . . . when reheat is the order!

OCCASIONALLY there arises a unique situation which specifically demonstrates why Kellogg has been selected so frequently to fabricate and erect the power piping for high temperature reheat units during the current power expansion period.

This one occurred during the installation of the piping for the Albany station of the Niagara Mohawk Power Corporation. In connection with improving the economics of the overall system, which includes the reheat cycle, Niagara Mohawk engineers developed a considerably simplified piping arrangement between the high pressure extraction heaters . . . one which eliminated customary expansion loops.

However, although this design had economic advantages, it posed a problem: Because of the absence of expansion loops, how severely would thermal expansion during the high heat of welding and heat treatment strain the flanges and bolts on the heaters? Excessive stresses on these joints might well cause leaks in service.

Since it is virtually impossible to calculate these forces with any accuracy, Kellogg called upon its stress analysis group to devise a procedure for controlling them. This was accomplished by the use of electrical strain gages mounted on supporting rods and on the heater shell as shown in the photograph. (See arrows)

As a result of readings taken throughout the cycle, standards were established for the field assembly of this design which assure protection of the flanged joints of these heaters.

Special groups which specialize in stress analysis with its required knowledge of mechanics of materials—of plastic and elastic theory . . . continuous research and development towards further improvements in materials and in fabricating and erecting techniques . . . continuous accumulation of a tremendous store of experience in fabricating and installing piping for more than six million KW's of output—these are among the reasons why "Reheat Power Piping by Kellogg" is so often the specification . . . 40 times within the recent expansion period.

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- Union D'Electricite (France)
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- Wisconsin Public Service Corp.

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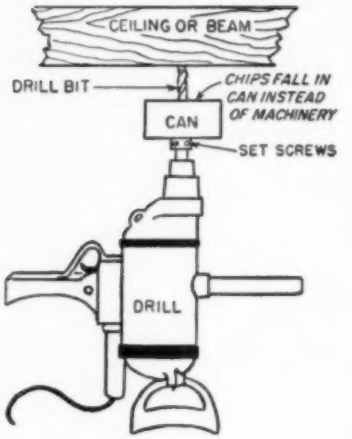
Drill Receptacle Catches Waste Chips

WE WERE remodeling the boarding and preboarding room in our hosiery plant and found it necessary to resume production before the lighting could be rearranged.

The continuous row flourescent fixtures were suspended by steel rods fastened through sections of ceiling I-beams, and in order to relocate the lights, it was necessary to drill new holes upward through the steel flanges. However, the steel chips from the drill bit were falling into the machinery and damaging the hosiery being processed. The supervisor declared that production operations would have to be stopped before the remodeling could be finished.

One of our maintenance men heard about the difficulty and obtained an empty can about 3¼″ in diameter by 2″ in height. The top of the can had been removed, and the bottom was intact. A collar was obtained (see sketch) measuring ⅞″ outside diameter, ½″ in height, and having a ½″ hole in the center. He drilled and tapped the collar for ⅛″ screws at three places equally distant on the outside circumference.

The collar was then soldered to the center of the can bottom, a drill bit was inserted through it, and the set screws tightened equally on the drill shank. This formed a cup around the drill bit,



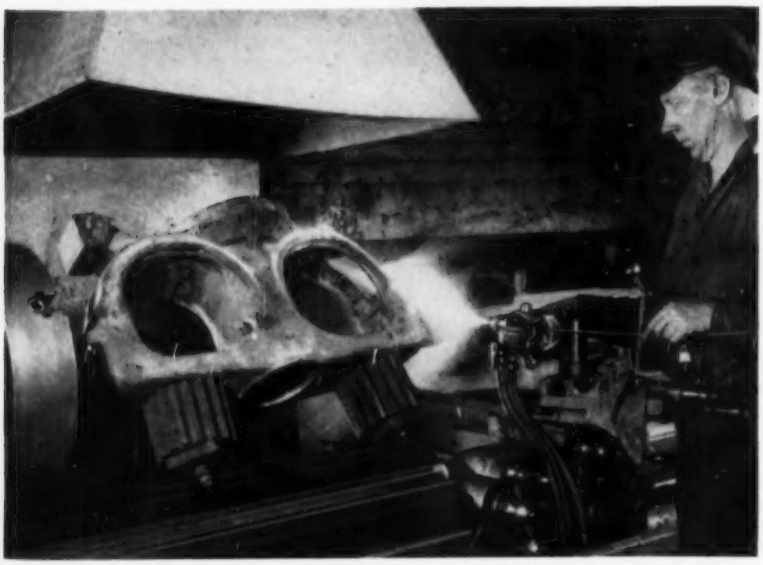
and when drilling was resumed, all of the chips were caught in the improvised cup, thereby permitting production to proceed during remodeling.

This idea can be used with most any kind of drill or auger. — *N. Roeller.*

Casting Repair Method Saves Money

THE Capital Transit Company of Washington, D. C., makes frequent use of metallizing in its Streetcar Maintenance and Bus Maintenance Shops. One of the jobs is the repair of streetcar body bolsters. This part is a casting which forms the control part of the "truck" carrying half the car weight. Center of the bolster is a female bearing surface which accepts the kingpin from the car frame on which the trucks turn when rounding curves. A stub shaft at each end of the bolster forms a bearing providing gimbal action for the truck on rough track bed.

Metallizing shaft of streetcar body bolster. The two gears are used as temporary counterweights. This metallizing user averages 12 bolster metallizing jobs per week—saves over $40.00 on each.



Process Data

The bolster shafts had become worn and flattened at the bottom causing a bumpy ride and accelerated wear on the related parts. Shafts are turned to true round, the surface is prepared for metallizing and is then sprayed with three pounds of hard steel to ⅛″ over the original 4″ diameter. Shafts are then finish ground to required dimensions.

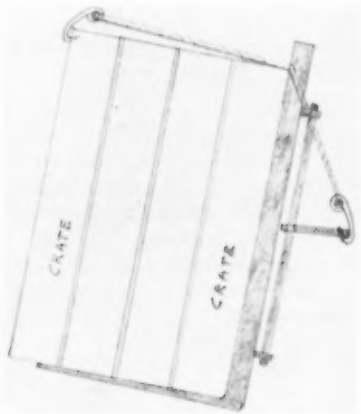
The entire job takes approximately three hours for two shafts. It is estimated by the shop supervisor that the company saves $41.51 on each bolster and that they metallize on an average of 12 per week. They formerly tried to repair the worn shafts with steel bands but this proved too costly. The metallized shafts will last on the average of 300,000 to 400,000 miles before they have to be re-metallized. This company also metallizes other worn streetcar and bus parts.

Crates "Locked" On Truck Forks

THIS fastening method was recently employed by a fork truck crew handling loads of medium weight crates.

As the crates were being moved a considerable distance, the fork truck operator wanted to safely carry as many as possible. The six foot long crates were loaded on edge but the final crate loaded (see sketch) projected several inches beyond the ends of the forks.

One of the assistants quickly came up with the necessary safeguard. Two hooks attached by eye splices to ropes came sailing over the crate tops from the rear, one on each side of the truck column or mast. Hooks were slipped into position, engaging the top outer corner slat of the front crate. The ropes became instantly tight.



Operating "trick" was a piece of round steel attached to each side of the 3 ft wide mast so that a foot long arm or lever could slide freely on these rods. The hole in the arm was a loose fit on the rod, so that when the hook on the rear end of the tie rope engaged the outer end of the arm, the arm would cramp the "loosely fitting hole" on the vertical rod at any point desired and lock the load in position.

The hook man had only to engage his hook in the hole drilled through the outer end of the arm, then press down firmly on the rod end of the arm and the load was instantly fastened in place. The rig could be just as easily unlocked. —H. B. McDermid.

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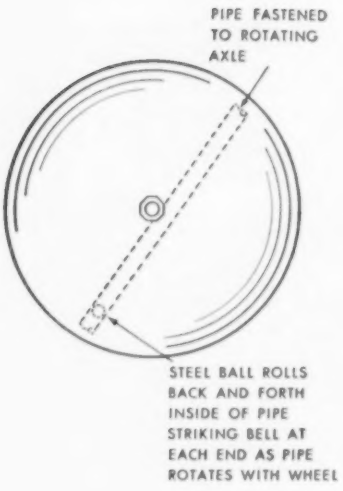

PIPE FASTENED TO ROTATING AXLE
STEEL BALL ROLLS BACK AND FORTH INSIDE OF PIPE STRIKING BELL AT EACH END AS PIPE ROTATES WITH WHEEL

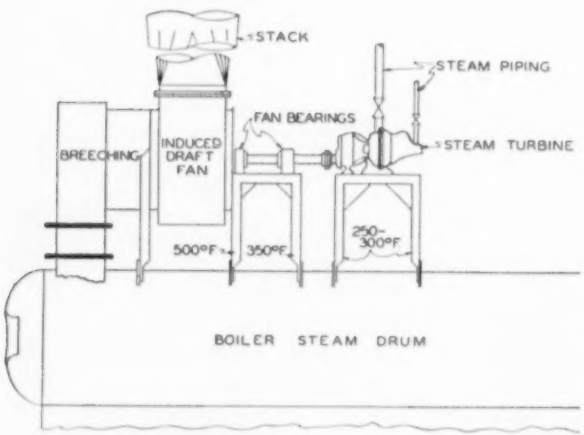
Warning Bell For Fork Lift Trucks

A BELL which automatically warns of the approach of a fork lift truck was made at Du Pont's Waynesboro Works, Waynesboro, Virginia, by installing a 10" fire alarm gong on one of its wheels.

A ¾" pipe was fastened inside the bell and a steel ball placed inside the pipe. As the wheel turns at slow speeds, the ball moves back and forth inside the pipe striking the gong. At higher speeds centrifugal force prevents the ball from moving in the pipe.

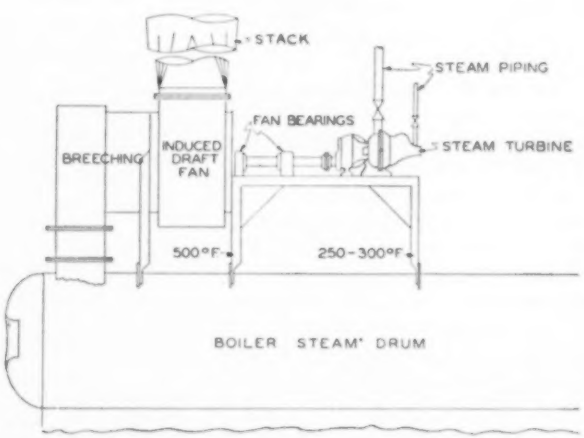
Mounting Method Modified for Induced Draft Fan and Turbine

THE maintenance expense of machinery, which is direct connected through a flexible coupling, is often dependent upon proper alignment of the driven and driver shafts. When the operating temperatures of the driven and driver machines are at or near atmospheric temperature alignment is relatively simple, but when high and variable temperatures are involved alignment becomes more complicated. In the case of a turbine-driven induced draft fan in a Southern refinery the effect of temperature so complicated the alignment problem, that it was necessary to revise the machinery mounting method.



Original Installation

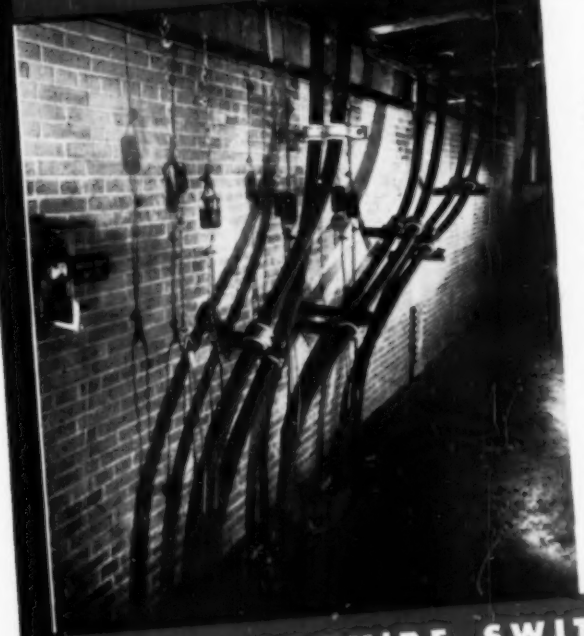
In the original installation of the turbine and fan, the fan bearings and turbine were mounted on separate platforms each of which was welded to the boiler steam drum. During operation of the boiler each of the platforms became heated by conduction to the approximate temperature shown in the sketch. The variation of these temperatures with the boiler steam load and the expansion of the steam drum longitudinally created a difficult alignment problem.



Revised Installation

Several attempts to align the equipment proved only partly successful and it was necessary to install a new mounting as illustrated, which consisted of one common baseplate with only two supporting legs. With this arrangement the difference in the temperature of the two supports does not effect the alignment of the fan and turbine, and the flexibility of the supports absorbs the boiler drum expansion thus minimizing the effect of temperature and simplifying alignment.

case history



no oil migration

This series of Okolite-Okoprene equalizer bus ties is installed in the Cincinnati Gas and Electric Company's West End Station. One of the reasons for choosing this cable design for vertical runs is that it eliminates oil migration problems inherent in varnished cambric and paper-insulated constructions. This feature is just one reason why today's best buy in high voltage cables is Okolite-Okoprene.

WHY THEY'RE SWITCHING TO OKOLITE

rubber-insulated cables for use up to 35,000 volts

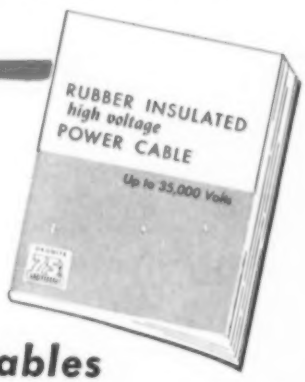
There is a distinct trend among industrials and public utilities toward Okolite rubber-insulated cables for high voltage use.

ADVANTAGES

1. **Lighter and easier handling.**
2. **Eliminates sheath corrosion and fatigue.**
3. **Simplifies splicing and terminating.**
4. **Moisture does not affect the insulation.**
5. **No oil migration at high temperatures or elevations.**
6. **Flexibility simplifies installation.**

APPLICATIONS

1. **Transmission and distribution circuits.**
2. **Generator and transformer leads.**
3. **Vertical risers and shaft cables.**
4. **Submarine power cables.**
5. **Portable substation cables and test leads.**
6. **X-ray cables.**



Send for this 128-page manual on rubber-insulated high voltage cable. It provides current carrying capacity tables, dimensional data, engineering information and installation procedures, complete instructions and detailed drawings for splices and terminations. Write for Bulletin SP- 1075 on your letterhead to The Okonite Company, Passaic, New Jersey.

OKONITE OKONITE SINCE 1878 ***insulated cables***

1871

Lime Kiln Repair

IT recently became necessary at a Southern paper mill to effect repairs to one of its rotary lime kilns. The nature of the repair called for turning the trunnions and tires in order that the kiln could be realigned and to regain the true and full bearing surface between the trunnions and tires as the kiln turns.

The job was done in a novel way with the kiln running. The machine shop designed and manufactured a simple compound mechanism long enough to cause (by manual feed) a lathe tool to be carried across the width of the trunnion. The frame holding the compound was laid out to bear on and fasten to the trunnion housing. When one trunnion was turned the jig was simply moved around to the opposite side, the tool was inverted and the other trunnion turned.

The tire presented a more difficult problem because the shifting of the lime within the kiln and the fact that the tire is not welded to the kiln causes the tire to keep changing its position. However, the same compound was used and a seat for the compound was built to accommodate the job. The compound was aligned parallel to the center line of the kiln so the trunnions could be realigned with the tire. The tire was then satisfactorily turned and the entire job completed in a manner to meet requirements without any loss of production.

The safety department came through with a heat reflecting material that was made up into shields back of which the workmen worked without too much discomfort.—*A. O. Mortenson, Chief Operating Engineer.*

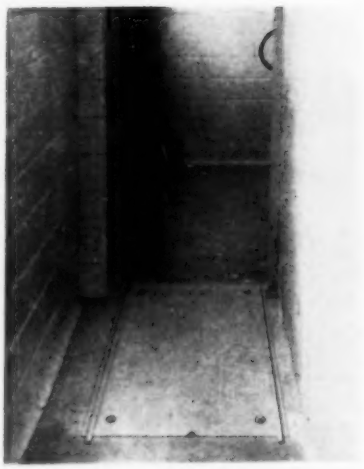
$$$ For Your Ideas

Send your ideas, methods and short-cuts to Southern Power & Industry. Payment is made for suitable material—a photo or rough sketch will make your idea more valuable.

Guide For Switchgear

IN a substation, where switchgear is mounted on rollers so it can be wheeled from the cubicles and taken into another section of the building for servicing, space limitations made it necessary to cut down the aisle space to barely more than clearance for the units.

To prevent the units from being damaged against the door and casing, a steel plate was bolted to the floor, after having welded along its length two strips of ⅜ x ¾ steel. These strips serve as guide rails and align the wheels on the switchgear units so that they can pass through the restricted clearance of the doorway in safety.—*Elton Sterrett, Houston, Texas.*



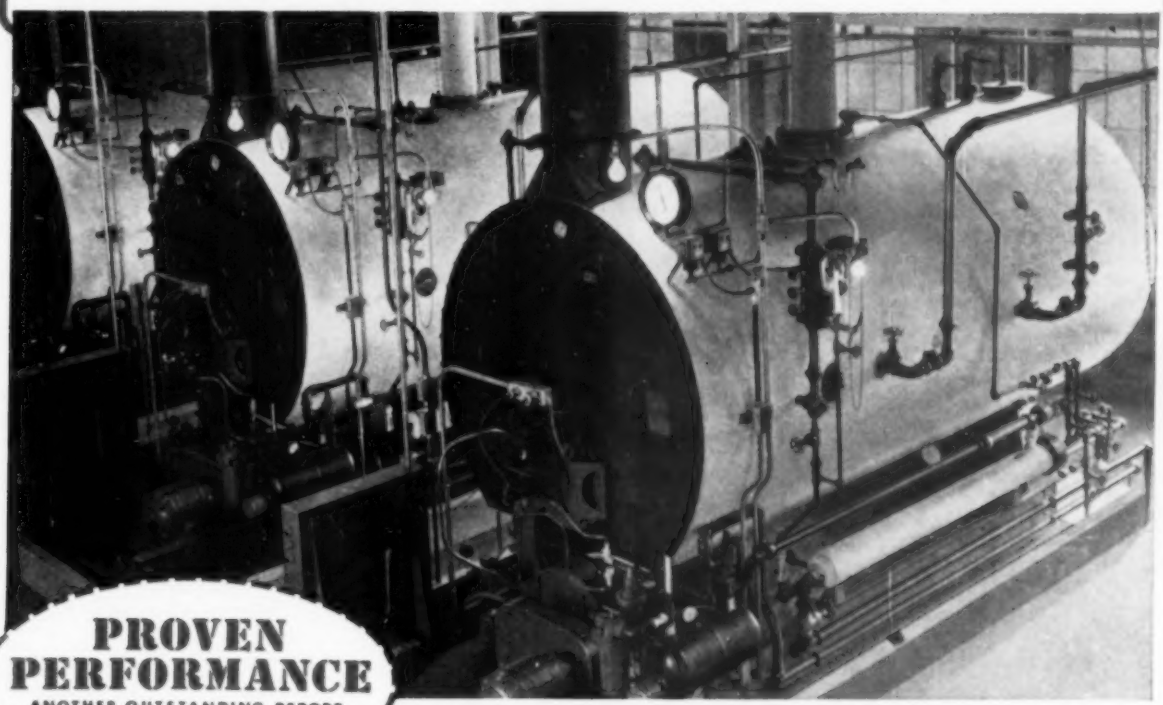
Pick Them Up Diagonally!

A NOVEL arrangement whereby the load is picked up diagonally by a Towmotor fork lift truck, has been devised by engineers of Bird & Son, Inc., manufacturers of building and roofing materials.

The new method enables the Towmotor to enter a freight car and stack the load to the right or left of the doors by making only a 45 degree turn, which requires less room than the full right angle turn otherwise necessary.

Manual handling is entirely eliminated, as the car can thus be loaded right up to the aisle between the doors, and the job then completed in the usual manner. Tighter stacking against the sides of the car is also said to result.

Cleaver-Brooks boilers save $25,000 per year for Hoosac Mills...pay for themselves in 2 years' time!



PROVEN PERFORMANCE

ANOTHER OUTSTANDING REPORT FROM A CLEAVER-BROOKS OWNER

After installation and starting service was completed, a check was made on boiler output. Tests indicated efficiency exceeded the guaranteed 80%. After eight months' operation without tube cleaning, stack temperature showed no noticeable gain, indicating high efficiency had been maintained. Planned and installed by Frank I. Rounds Co., Newton Highland, Mass.

INSTALLING 3 Cleaver-Brooks self-contained boilers at Hoosac Textile Mills, New Bedford Division, was a major step in ending boiler worries. Hoosac can count on yearly savings of $25,000, and they're set up for future expansion as well.

Before deciding what type of boilers to install for replacing old, hand-fired boilers, Hoosac carefully considered these factors:

1. **Efficiency of steam generation** — the cost for supplying 12,000 lbs. of steam required each hour at peak capacity for heating and processing.
2. **Saving labor costs** — through safe, automatic operation.
3. **Cleanliness** — important to textile manufacture.

A study of past performance and prominence of similar units in the industry — showed that Cleaver-Brooks self-contained boilers would fill the bill.

Guaranteed 80% thermal efficiency was one of many influencing factors in selecting the 3 Cleaver-Brooks 150 hp. boilers. Even with loads as low as 30% of rating, these boilers operate with a flat 80% efficiency. (Hoosac operates their plant over widely fluctuating loads, particularly in summer.)

That they attained their objectives is borne out by these results — *results which showed the boilers paid for themselves in 2 years' time.*

1. **$15,000 savings in fuel** — fuel cost studies showed 275,000 gals. of oil at 5½¢ per gal. provide steam for a year's operation. Same steam formerly required 2,000 long tons of coal at $15.00 per ton.
2. **$10,000 savings in labor costs** — fully automatic operation minimized boiler maintenance. Personnel were then available for productive plant work.
3. **Cleanliness** — modern boiler room proved more efficient than previous cluttered arrangement. Hand firing, removal and disposal of fly-ash was eliminated.

In addition to these substantial savings, the installation provided for economical future plant expansion. At present, boiler operation is rotated so all three periodically receive the same service and maintenance.

Cleaver-Brooks boilers are showing similar savings in many other businesses. Investigate — write for Catalog AD-100 and complete information on standard size oil, gas, combination oil/gas fired Cleaver-Brooks boilers, 15 to 500 hp., 15 to 250 psi.

CLEAVER-BROOKS COMPANY
Dept. P—305 E. Keefe Ave.,
Milwaukee 12, Wis., U.S.A.

Cleaver-Brooks

ORIGINATORS OF THE SELF-CONTAINED BOILER

Steam Boilers • Oil and Bitumin Tank Car Heaters • Distillation Equipment Oil and Gas Fired Conversion Burners

NEWS *for the South and Southwest*

Atlanta Industrial Show by J. M. Tull Metal & Supply

A Welding Clinic, Metal Show and Fluid Handling Exposition was sponsored by the J. M. TULL METAL AND SUPPLY COMPANY, INC., October 7, 8, and 9, in connection with the opening of a 22,000 sq ft addition to their Foundry Street warehouse in ATLANTA, GEORGIA. The mill supply house serves industrial, power, and service plants throughout the Southeast and Mid-South.

Forty of the country's largest manufacturers cooperated to provide one of the most informative shows ever held in the area. Nearly 200 specialists, and technicians demonstrated recent developments in welding and cutting and discussed trends in fluid handling methods.

Of particular interest was the new 12 ft Niagara Shear recently installed by the Tull Company. One of the largest in the South, the shear is capable of cutting up to ¾ in. mild steel in widths up to 12 ft. It will enable Tull to give warehouse service on items which heretofore had to be obtained from mill connections.

J. M. Tull, founder and chairman of the board discusses welding and brazing of aluminum with *W. M. Rogerson* of Alcoa's process development laboratories.

Among the 40 exhibitors at the J. M. Tull industrial show were: Air Reduction, Alcoa, American Brass, American Cast Iron Pipe, Arcos, Armco, Carborundum Company, Carpenter Steel, Driver Harris, Duriron, Electric Steel Foundry, Fulton Sylphon, Handy & Harmon, Hills McCanna, International Nickel, Jenkins Bros., Linde Air, Lukens Steel, Manning, Maxwell & Moore, Mason-Neilan, National Tube, Newark Wire Cloth, William Powell, Superior Tube, Binks Manufacturing, Boston Gear Works, Skil Corporation, Bunting Brass & Bronze, Tube Turns and Wall Colmonoy. Recently issued industrial films were also shown.

Riley Stoker Names Griffith

RILEY STOKER CORPORATION, Worcester, Mass., has appointed ROBERT K. GRIFFITH as District Manager of its Philadelphia territory. Mr. Griffith, who has been associated with Riley for many years, succeeds R. M. Bassett, who recently retired.

Talon Opens Georgia Plant

TALON, INC., Meadville, Pa., has completed its newest Southern plant, at CLEVELAND, GEORGIA. Fasteners produced at Cleveland will be disseminated from the company's ATLANTA warehouse to customers in the Southeast.

Over 125 persons are employed at the new plant. Management is under supervision of LEWIS R. COOPER, assisted by FRANK KINNEAR.

FUTURE EVENTS Of Engineering Interest

AMERICAN SOCIETY OF MECHANICAL ENGINEERS, C. E. Davies, Sec'y, 29 West 39th St., New York, N. Y.
Nov. 29-Dec. 4, Annual Meeting, Statler Hotel, New York, N. Y.

EXPOSITION OF CHEMICAL INDUSTRIES, Charles F. Roth, Mgr., International Exposition Co., 480 Lexington Ave., New York 17, N. Y.
Nov. 30-Dec. 5, 24th Exposition, Commercial Museum & Convention Hall, Philadelphia, Pa.

NATIONAL ASSOCIATION OF CORROSION ENGINEERS, A. B. Campbell, Exec. Sec'y, 1061 M&M Bldg., Houston 2, Texas.
Dec. 1-4, Corrosion Conference, University of Oklahoma, Norman, Okla.
March 15-19, 1954, Tenth Annual Conference & Exhibition, and Refinery Industry Symposium, Kansas City, Mo.

AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS, H. H. Henline, Sec'y, 33 West 39th St., New York 18, N. Y.
Jan. 18-22, 1954, Winter General Meeting, Statler Hotel, N. Y.

PLANT MAINTENANCE & ENGINEERING SHOW, Clapp & Poliak, Inc., 341 Madison Ave., New York 17, N. Y.
Jan. 25-28, 1954, Exposition, International Amphitheatre, Chicago, Ill., and Plant Maintenance & Engineering Conference, Hotel Conrad Hilton, Chicago, Ill.

INSTRUMENTATION SYMPOSIUM, Prof. C. D. Holland, Director, Agricultural & Mechanical College of Texas, Chemical Engineering Department, College Station, Texas.
Jan. 27-29, 1954, Ninth Annual Symposium on "Instrumentation for the Process Industries," Memorial Student Center, Texas A&M College, College Station, Texas.

SOUTHERN SAFETY CONFERENCE AND EXPOSITION, W. L. Groth, Exec. Dir., P. O. Box 8927, Richmond 25, Va.
March 7-9, 1954, Fifteenth Annual Conference and Exposition, Kentucky Hotel, Louisville, Ky.

Deluxe Saw & Tool—N. C.

CALVIN W. TITTSLER has been appointed Eastern and Southern regional sales manager for DELUXE SAW AND TOOL COMPANY, of HIGH POINT, N. C., a subsidiary of Rockwell Manufacturing Company.

Mr. Tittsler, service engineer with the company's Crescent Machine Division for 13 years, will make his headquarters in High Point.

Deluxe, which recently transferred its national headquarters from Columbus, Ohio, to its High Point plant, manufactures carbide-tipped circular saw blades and other tools under the trade name of "Karbide King."

Alloy Rods—S.E., S.W.

VIRGIL C. REED, a native of Houston, has been appointed field representative for the Southeastern and Southwestern States by the ALLOY RODS COMPANY, York, Pa., manufacturer of alloy arc welding electrodes.

Mr. Reed attended the University of Houston and has had wide experience in the engineering and sales aspects of the welding industry. He will make his headquarters at 7216 La Paseo Drive, HOUSTON 17, TEXAS.

Rockwell Mfg. Co.—Tulsa

ROCKWELL MANUFACTURING COMPANY is transferring all of its gas industry instrument production from Pittsburgh to its Macnick Division plant in TULSA, OKLA.

When the move is completed, all Rockwell combined record gauges, Emcorrectors, flow line provers and flow line indicator meters will be turned out at the Tulsa plant.

There will be no physical expansion of facilities at Tulsa, but some machinery is being moved there from Pittsburgh and new employees will be added. General Manager of the Macnick Division is W. M. CONNOR.

American Mat—D. W. Moor, SE

CHARLES B. BLOOD, 4097 Peachtree Road, Brookhaven, Georgia, has been appointed Southeastern sales manager of the AMERICAN MAT CORPORATION and D. W. MOOR COMPANY, both of Toledo, Ohio. Blood formerly served as a territorial manager for the two companies.

He will cover the states of North and South Carolina, Alabama, Georgia, Florida and Tennessee with the complete lines of floor matting.

Have you ever stopped to figure the cost of hot, stagnant air and disagreeable odors? Add up resulting poor employe efficiency and bad customer relationships... it can cost plenty!

Here are some answers to your ventilation problems:

Emerson-Electric has two catalogs that will help to effectively solve such problems in stores, offices and institutions. They include suggestions for efficient fan installations, plus complete product information on dependable Emerson-Electric Exhaust Fans and Air Circulators. Good air is good business ... let it make money for you.

THE EMERSON ELECTRIC MFG. CO.
St. Louis 21, Mo.

The Emerson Electric Mfg. Co.,
St. Louis 21, Missouri

FREE—Without obligation, send me the Emerson-Electric Catalog(s) checked:

☐ 751-A Exhaust Fans ☐ No. 751-B Air Circulators

NAME _____ TITLE _____

COMPANY _____

ADDRESS _____ CITY _____ STATE _____

EMERSON ELECTRIC
FANS • MOTORS APPLIANCES

Baker-Raulang—Florida

Appointment of A. & W. ENGINEERING COMPANY, 2222 N. W. 14th Street, MIAMI as representative for Baker industrial trucks and cranes in southern FLORIDA was announced recently by BAKER-RAULANG CO. Headed by A. R. FULTON, A. & W. offers engineering services for materials handling on a 24-hour call basis.

Newly appointed Baker representative in central Florida is the CHAPMAN MACHINERY COMPANY, 210 13th Street, Tampa, headed by J. C. M. CHAPMAN.

Elgin Softener—Tex., Mo.

ELGIN SOFTENER CORPORATION, Elgin, Ill., manufacturer of water conditioning equipment and water treating chemicals, announces the appointment of STANLEY E. KERR, JR., 374 Liberty Drive, CORPUS CHRISTI, TEXAS as representative in Southeastern Texas. Mr. Kerr succeeds Gordon Harwood who passed away recently.

FRANK LEONARD is now associated with F. S. CROOK COMPANY, 455 Paul Brown Building, ST. LOUIS, Elgin's representative in Missouri, Kansas and Southern Illinois.

Farr Southern Division

FARR COMPANY, Los Angeles, Calif., manufacturer of air filters and air filtration equipment, announces the establishment of a Southern Division sales office in the Sterick Building, MEMPHIS, TENNESSEE, headed by DONALD HARWORTH, Southern Division Sales Manager.

Diamond Alkali Promotions

Promotion of two veteran executives to vice-presidencies and formation of two new divisions in DIAMOND ALKALI COMPANY were announced by President Raymond F. Evans following a recent meeting of the Board of Directors.

W. H. MCCONNELL, Director of Sales, has been elected Vice-President-Sales. C. E. LYON, Works Manager of Diamond's electrochemical plant at HOUSTON, TEX., also becomes a vice-president.

The new divisions are the Plastics and Agricultural Chemicals Division with A. L. Geisinger, a vice-president, as general manager of the division; and the Chromium Chemicals Division with Frank W. Jarvis as general manager.

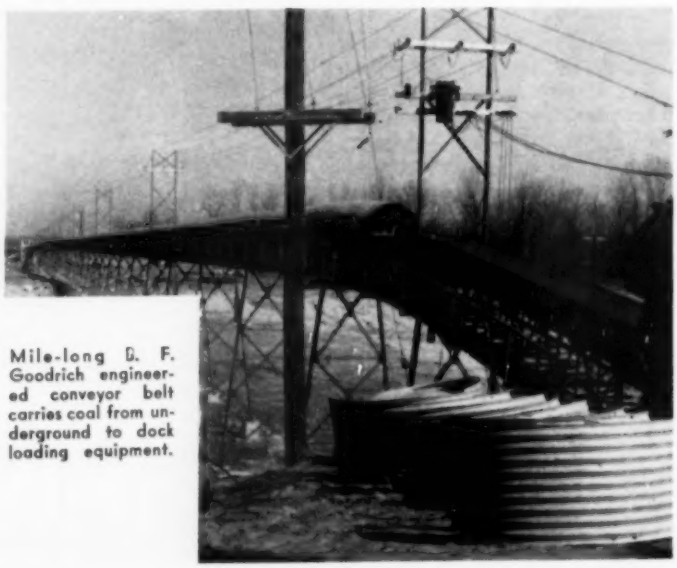
Termination of Uniontown Mine's mile-long conveyor is this floating dock. The 3300 ton coal barges are the largest ever used on inland waterways.

Nearly a Mile of Conveyor Belts in Modern Kentucky River-Loading Mine

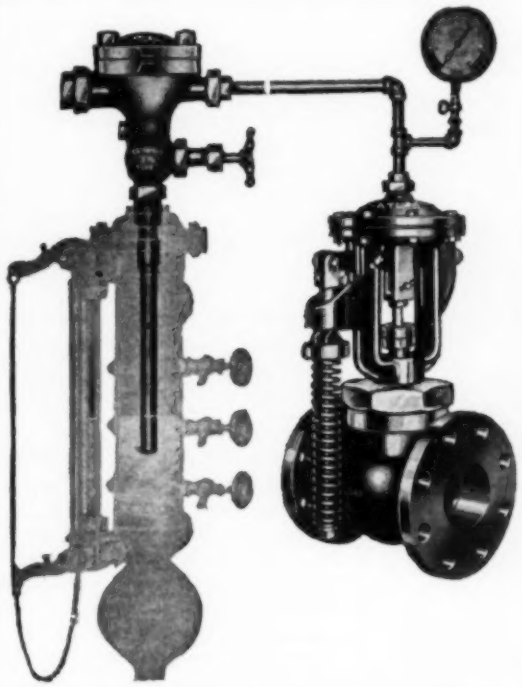
THE completely mechanized modern Uniontown Mine of the Nashville Coal Company at Uniontown, Kentucky, is a continuous belt line operation moving coal from the bottom of a 1200 ft slope to a preparation plant (almost completely underground) and then to a floating loading dock on the Ohio River.

Design feature is the B. F. Goodrich Co. conveyor belt system that carries the coal from underground to the dock loading equipment on the river at the rate of 1200 tons per hour. About 1200 ft of the belt are underground and the other 3800 ft run on an overhead trestle 20 ft above the ground.

Coal is mechanically loosened and transported to the conveyor, which comes up above the ground "climbs up onto the trestle and travels on a fixed track as far as the control tower. There it is transferred to a mobile conveyor-on-tracks, which adjusts to the rise and fall of the Ohio River. As the water rises, the conveyor is run up the bank; as the water falls the conveyor is lowered down the track to the necessary level. At the end of this conveyor-on-tracks the floating dock takes over."



Mile-long B. F. Goodrich engineered conveyor belt carries coal from underground to dock loading equipment.



CAMPBELL
Boiler Feed Water Regulator

1—Continuous Blowdown;
2—No Moving Parts;
3—No Thermostats;
4—No Floats;
5—No Links;
6—No Generators.

The above are six of the principal reasons why operating engineers prefer the CAMPBELL Boiler Feed Regulator. All of those reasons are exclusively CAMPBELL features. Point No. 1—Continuous Blowdown—is an outstanding reason why the CAMPBELL is so well liked wherever used. For many years the CAMPBELL has been successfully controlling all types and sizes of boilers. The slightest change in water level causes the regulator to operate the largest control valves instantly. Rugged. Efficient. Economical. No fine adjustments. 50 to 400 lb. pressure. Sizes 1" to 6". Guaranteed. Easily installed by any competent mechanic.

The Indicating Gage

The CAMPBELL also includes a Pressure Indicating Gage (shown above)—another exclusive feature. This gage can be placed on your switchboard or control board, to show precisely what the CAMPBELL is doing at all times.

See list below of the principal ATLAS Products

ATLAS VALVE COMPANY
REGULATING VALVES FOR EVERY SERVICE
275 SOUTH STREET NEWARK 5, N. J.

Agents in Principal Cities of the South

Reducing Valves
Damper Regulators
Temperature Regulators
Exhaust Control Systems
Back Pressure Valves
Float Valves
Pressure Regulators
Pump Governors
Balanced Valves
Control Valves
Oil Control Cocks

COMPACT EFFICIENT DEPENDABLE
FOR MODERN SCHOOL HEATING

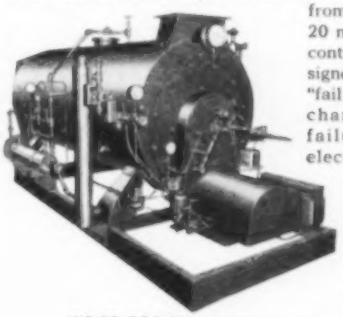
Hillendale Elementary School
Montgomery County, Maryland
McLeod & Ferrara, Architects
Washington, D. C.

CYCLOTHERM*
CYCLONIC COMBUSTION

COMPACT . . . No extensive stack, foundation, insulation, excavation or instrumentation is required. Cyclotherm Units are delivered complete, the Contractor sets the boiler on the spot you choose and makes five easy connections; fuel, electricity, water, steam and a simple flue to comply with local codes. The Cyclotherm is the smallest fire tube boiler available for its rated capacity, which provides the architect maximum use of space.

EFFICIENT . . . The efficiency of any boiler is determined by the rate of heat transfer from fuel to useful heat. The superior advantage of a Cyclotherm Unit is due to the increased transfer of heat by radiation of the flame, the characteristic of which is controlled by Cyclonic Combustion, a patented combustion method used in Cyclotherm Units which allows a guaranteed minimum efficiency of 80% and low fuel consumption.

DEPENDABLE . . . Cyclotherm boilers give you full power from a cold start in 15 to 20 minutes. The electronic control system is so designed that the boiler will "fail safe" in case of mechanical breakdown or failure of fuel, water or electricity. Local factory trained engineers are always ready to give you immediate service and keep your boiler running smoothly.



WRITE TODAY for your copy of "All Your Questions Are Answered by Cyclotherm" and find out why Cyclotherm Steam Generators have been proven superior in thousands of installations. Just drop a post card to Cyclotherm, Dept. 34, Oswego, New York.

*Reg. trade name

CYCLOTHERM STEAM GENERATORS
CYCLOTHERM DIVISION UNITED STATES RADIATOR CORP.—OSWEGO, NEW YORK

Corrosion Tour—Texas

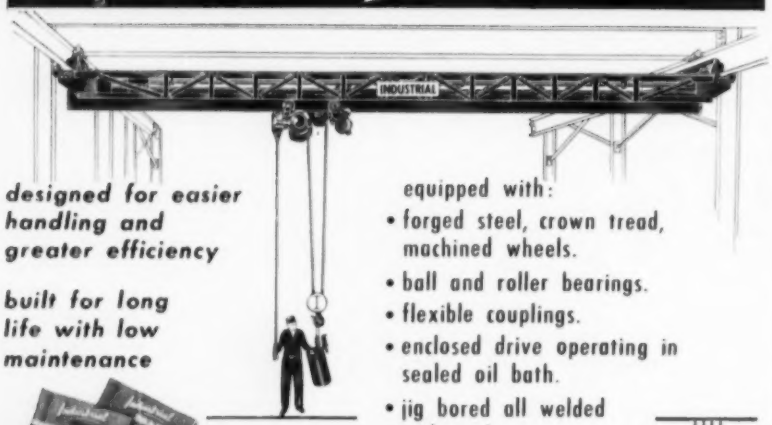
The third biennial corrosion tour, sponsored by the Permian Basin Section of the NATIONAL ASSOCIATION OF CORROSION ENGINEERS, was held Sept. 30 to Oct. 2 with headquarters in ODESSA, TEXAS.

Engineers visited many sites where corrosion was a problem, and learned about its solution. When concrete particles from cement lined pipe clogged check valves in a gathering system at a Magnolia Petroleum Co. operation, corrosion engineers replaced the concrete lined pipe with transite pipe, which has given satisfactory service.

On the Humble Oil & Refining Company's J. E. Parker Lease, they inspected the interior of a 1000-barrel bolted steel tank. In September, 1946, the tank was coated with the primer and three coats of liquid vinyl plastic. The deck was galvanized prior to coating. The 1949 NACE Corrosion Tour found the sides of the tank in excellent condition, but the deck had several pinpoint blisters evidently caused by hydrogen sulphide. A sand layer prevented inspection of the tank bottom. When inspected in 1951, the coating was found to have withstood corrosive action exceptionally well. However, this year's Corrosion Tour found a few blisters.

Examples of Carlon "B" pipe successfully used as a gathering line, and use of ammonia as an inhibitor were also seen.

LOWER YOUR COSTS with Industrial CRANES



designed for easier handling and greater efficiency

built for long life with low maintenance

equipped with:
- forged steel, crown tread, machined wheels.
- ball and roller bearings.
- flexible couplings.
- enclosed drive operating in sealed oil bath.
- jig bored all welded end trucks.

WRITE FOR CATALOGS

Industrial CRANES

INDUSTRIAL CRANE & HOIST CORPORATION
(formerly Industrial Equipment Co.)
373 NORTH ADA STREET CHICAGO 7, ILLINOIS
Overhead Cranes • Jib Cranes • Monorail Systems • Crane Runways
Representatives in Principal Cities

Southern Representatives are Located in

Atlanta	Mobile	Dallas
Jacksonville	Nashville	San Antonio
Houston	Knoxville	Tulsa
Chattanooga	Memphis	Oklahoma City
Birmingham	Shreveport	Tampa
New Orleans		Miami

Write for Name of Nearest Agent

Marlow-Bell & Gossett Merger

MARLOW PUMPS, Ridgewood, N. J., manufacturer of self-priming centrifugal pumps, is merging with the BELL & GOSSETT COMPANY, Morton Grove, Ill., manufacturers of hot water circulating pumps, universal pumps, heat exchangers, flow control valves and other heating specialties, effective Dec. 1.

Under the new set-up, Marlow Pumps will be known as the Marlow Division of Bell & Gossett and will be headed by A. S. Marlow, Jr., as General Manager. He will also be a Vice President and a member of the Board of Directors of Bell & Gossett.

Chrysler Airtemp—Florida

E. D. DICKSON has been named to head CHRYSLER AIRTEMP'S new FLORIDA sales region, with headquarters at 2357 S.W. 22nd St., Canal Way, Miami.

Mr. Dickson has been associated with the company since 1940. He has served as supervisor of planning, staff specialist and recently as manager of the parts and order department.

New Jantzen Plant—S. C.

THE JANTZEN COMPANY, Portland, Oregon, manufacturer of swim suits, has completed a new plant in SENECA, SOUTH CAROLINA. Training production was underway late in October.

General contractor for this half million dollar 24,000 sq ft sewing mill was the Daniel Construction Company of Greenville, S. C., and Birmingham, Alabama. A unique feature is the 100 ft clear span timber truss construction. The plant has brick curtain walls with steel columns, is completely air conditioned, and has a rigid board insulation on the top of the roof deck.

Tube Turns—Tulsa, Okla.

CLYDE CHRONISTER has been assigned to the Tulsa office of TUBE TURNS, INC., LOUISVILLE, KY., as a sales engineering representative.

Mr. Chronister was born in Oklahoma and attended Tulsa University. Prior to becoming associated with Tube Turns, Inc., in June, 1953, he was the Orbit Valve Company's repsentative east of the Mississippi.

Atlantic Steel Names Brooks

GORDON E. BROOKS has been named Atlanta Sales Representative of the ATLANTIC STEEL COMPANY, Atlanta, Ga.

Mr. Brooks joined the company in 1933, and has served in the order and scheduling departments, as well as in various sales capacities. Since 1948, he has been sales representative in north and central Georgia for Dixisteel Products.

Board of Trade, Port of Corpus Christi, Formed

The initial step in a program to foster the industrial development of the Corpus Christi area and to stimulate growth of the city's port was taken with the filing of a charter for the BOARD OF TRADE, PORT OF CORPUS CHRISTI, 217 Hackley Bldg., Corpus Christi, Texas.

O. W. JONES, former industrial development director of the Central Light and Power Company, will actively direct work of the organization.

Instrumentation Symposium Scheduled for Texas A & M

THE AGRICULTURAL AND MECHANICAL COLLEGE OF TEXAS will hold its ninth annual Symposium on "Instrumentation for the Process Industries," on January 27, 28 and 29, 1954.

The program, held in the Memorial Student Center on the campus, is sponsored by the College in conjunction with Southwestern industrial firms and manufacturers of instrument and control equipment. The lecture course will be conducted as a seminar, with qualified speakers to discuss new developments in instrumentation and control, being displayed by manufacturers.

Information, including a program announcement, may be obtained from the Director, Professor C. D. Holland, Chemical Engineering Department, Texas A & M College, College Station, Texas.

ELECTRONIC TELEPHONE LICKS NOISE!

MODEL NO. 100

*The GAI-PHONE

MAKES COMMUNICATION POSSIBLE IN EXTREMELY NOISY AREAS.

- NO BOOTH REQUIRED.
- SURPRISINGLY LOW COST.
- PROVED PERFORMANCE.
- RUGGED LONG-LIFE CONSTRUCTION.
- OPERATES AS CONVENTIONAL TELEPHONE.
- EASILY INSTALLED IN EXISTING TELEPHONE CIRCUITS.

GAI-TRONICS CORPORATION
A SUBSIDIARY OF GILBERT ASSOCIATES, INC., ENGINEERS AND CONSULTANTS
READING, PA.

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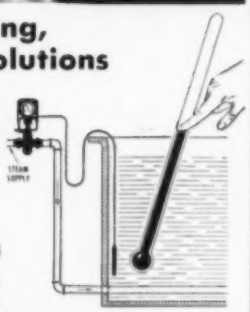
WRITE · GAI-TRONICS CORPORATION DEPT. P, READING, PENNA.

Carbide & Carbon—W. Va.

The appointment of DR. RAYMOND W. MCNAMEE as Manager of Research Administration of UNION CARBIDE AND CARBON CORPORATION was recently announced. Dr. McNamee will help co-ordinate the research activities of all of the corporation laboratories where basic research and development is being done on alloys, chemicals, gases, carbons, and plastics.

Dr. McNamee joined the Corporation at SOUTH CHARLESTON, WEST VIRGINIA, in 1933 and, since 1950, has been Superintendent of the Research and Development Department of Carbide and Carbon Chemicals Company, a Division of Union Carbide. His successor, DR. FRANKLIN JOHNSTON, joined the company in 1933.

For Plating Anodizing, Bonderizing, Pickling, Cleaning and Rinsing Solutions



POWERS No. 11-MF Regulators insure most effective use from various solutions by holding them at the right temperature automatically. They save Steam and Labor.

Plastic Thermal Bulb and Tubing is highly resistant to solutions used in above processes. Prevents electrical shorts. No insulators required for the regulator.

Easy to Read 4" Dial Thermometer indicates temperature of liquid being controlled and makes it easy to adjust regulator for different temperatures.

Bulletin 330 fully describes this simple, self-operating regulator. May we send you a copy? (b30)

THE POWERS REGULATOR CO., SKOKIE, ILL.
Offices in over 50 Cities, see your Phone Book • Established in 1891

1333 Spring St., Atlanta, Ga.—101 N. Elm St., Greensboro, N. C.

Christenson Re-elected

FRANK CHRISTENSON, of REFRACTORY & INSULATION CORPORATION, New York, was recently re-elected president and chairman of the board of the INDUSTRIAL MINERAL FIBER INSTITUTE, INC., at its thirteenth annual meeting at Hot Springs, Va.

M-H Opens New Dallas Office

A new 13,000 sq ft sales office and warehouse has been opened in DALLAS, TEX., by the MINNEAPOLIS-HONEYWELL REGULATOR COMPANY. It will house the company's Southwestern regional office which serves Texas, Oklahoma, Kansas and parts of Louisiana, Mississippi, Arkansas, Missouri and New Mexico. FRED C. BRANDT is regional manager.

Gastonia, N. C. Mill Adds Plant Safety Equipment

Helping to make every supervisor an expert in the prompt administration of artificial respiration in an emergency is this portable unit, recently added to the safety equipment at the Gastonia, N. C., plant of the FIRESTONE TEXTILES DIVISION, The Firestone Tire & Rubber Company.

A development of Mine Safety Appliances Company, the Pneolator administers artificial respiration automatically to revive victims of accidental asphyxia and for the emergency treatment of respiratory ailments. The instrument is kept in the plant's First Aid Room where it is immediately available when needed.

Dr. W. B. Parks, plant physician, Firestone Textiles, Gastonia, N. C., watches safety director *L. B. McAbee* fit the facepiece over the nose and mouth of *J. B. Mitchell*, pump maintenance engineer, during a demonstration of the instrument.

G-E's Expansion in The South & Southeast

Rapid industrial development in the South figured prominently in the future planning of the GENERAL ELECTRIC COMPANY as it recently celebrated its Diamond Jubilee Anniversary.

C. J. HENDON, Commercial Vice President of G-E in the Southeast, said the potential of the electrical manufacturing industry is more evident in the South than in any other section of the country.

"The increase in electric power production in the South in recent years has been running at a rate more than double that of any other region in the United States," Hendon said. "Increased power production is always the best measure of general economic progress, meaning greater productivity and a steadily rising standard of living."

While G-E first began to plan on the Southeast as a potential industrial center in 1937, it has been in the post-war period that the greatest expansion has been experienced. By 1950, there were more than 9,000 General Electric employees in ten Southeastern states earning more than $35,000,000 per year.

In 1952, G-E opened a plant in ASHEBORO, N. C., for the manufacture of electric blankets and heating pads. In the same week, it opened a plant in ANNISTON, ALA., for the manufacture of electronic tubes. Next year, G-E will dedicate transformer manufacturing plant in ROME, GA., which will cost about $30,000,000 and eventually employ more than 1800 workers. Now about one-third complete is the 942-acre Appliance Park in LOUISVILLE, KY., the new headquarters of G-E's Major Appliance Division.

Addition of these new plants to existing G-E manufacturing centers in the Southeast will bring total employment to more than 27,000 with annual earnings of more than $100,000,000. G-E is further represented in the Southeast by hundreds of offices, warehouses and service shops and thousands of distributors and dealers.

G-E plants in the Southeast prior to 1952 included a fluorescent lamp plant in JACKSON, MISS., a Christmas tree lamp factory in MEMPHIS, TENN., a lamp wire plant in GOLDSBORO, N. C., a headlight plant in LEXINGTON, KY., a receiving tube plant in OWENSBORO, KY., and a Navy test center in KEY WEST, FLA.

Now PULSOLATOR is made and sold by Manzel

Manzel has added the world-famed *Pulsolator* to its established line of Force Feed Lubricators and Chemical Feeders. Thus, this 55 year old organization now offers low pressure, single pump lubrication for applications where the unlimited pressure of Manzel force feed, individual pump systems is not required.

Here are three typical applications showing *Pulsolator* automatic, loop systems for lubricating machine tools, printing presses and comparable equipment. As many as 1,000 bearings can be lubricated by one system from a loop line of up to 300 feet. Capacities, timing, and quantity of lubricant delivered can be adapted to individual requirements. Manzel engineers will be glad to plan a system to meet your exact needs either on new machines you are planning or on existing equipment.

Manzel

DIVISION OF FRONTIER INDUSTRIES
318 BABCOCK STREET, BUFFALO 10, NEW YORK

news for the South and Southwest *(continued)*

Johnson Bronze—Charlotte

JOHNSON BRONZE COMPANY, New Castle, Pa., has established a new sales office and warehouse at 831 East Ninth St., CHARLOTTE, N. C. A complete stock of bronze bars, electric motor bearings and automotive bearings and bushings will be carried to more efficiently serve industry in the Southeast.

VEPCO Executives

Three executives of the VIRGINIA ELECTRIC AND POWER COMPANY have been named to new positions within the organization.

JAMES S. HAMILTON, formerly manager of Vepco at Portsmouth, has been appointed director of rural sales with headquarters in Richmond. He is succeeded in Portsmouth by G. FRED COOK, JR., who has been director of the company's employee information program for the past fourteen months. Cook's replacement as director of employee information is P. W. SMITH, formerly director of residential sales.

protect your machinery with

maintenance-free

LOVEJOY

FLEXIBLE COUPLINGS

When you install Lovejoy Flexible Couplings you get more than just long-lasting smooth power transmission. You get maximum protection against surge, backlash and starting torque. You get reduced down-time and less maintenance, since cushions can be changed without shutdown and Lovejoy Flexible Couplings *never* require lubrication.

Accurately machined bodies and jaws and cushioning materials engineered to the load conditions are combined in a compactly designed coupling to keep your machinery running better . . . longer.

TYPES AND SIZES FOR ALL APPLICATIONS!

Send for complete catalog . . . contains full technical data and handy selector charts for your convenience. Yours without obligation.

Also Mfrs. of Lovejoy Variable Speed Pulleys and Universal Joints.

LOVEJOY FLEXIBLE COUPLING CO.

5011 West Lake St. Chicago 44, Ill.

Rockwell Mfg. Co.—Tulsa

A. A. FOMILYANT, Los Angeles district manager of ROCKWELL MANUFACTURING COMPANY'S Meter and Valve Division, has been named general manager of the company's Macnick Division at TULSA, OKLA. Mr. Fomilyant joined Rockwell in 1938 as a sales engineer. He succeeds W. M. Connor at Tulsa.

Gattshall of Republic Rubber, Atlanta, Retires

REPUBLIC RUBBER DIVISION, Lee Rubber & Tire Corporation, Youngstown, Ohio, has announced the retirement of RALPH M. GATTSHALL, Southern District Manager, with headquarters in ATLANTA, GEORGIA.

Mr. Gattshall, who had been with the company for 31 years, served in various capacities including zone manager, advertising manager, and manager of distributor sales, before opening the Southern district office in 1936.

Ralph M. Gattshall

Gattshall is well known by manufacturers and distributors throughout the country. In 1931 he helped to organize the Joint Merchandising Committee of the National Industrial Distributors' Association, the Southern Industrial Distributors' Association and the American Machinery and Supply Association. Taking a leave of absence from his position of Advertising Manager of the Republic Rubber Division he served for two years, from 1931 to 1933, as Executive Manager of the Committee and is universally credited with doing much toward coordinating the merchandising policies of the three national organizations.

Brooks of Boiler Equipment Service Co., Atlanta, Dies

EUGENE A. BROOKS, founder of the BOILER EQUIPMENT SERVICE CO., 686 Greenwood Ave., N.E., ATLANTA, GEORGIA, died recently at the age of 62, after an extended illness.

Mr. Brooks, a native of Atlanta, was graduated from Georgia Institute of Technology in 1912. He was active in civic and engineering organizations, being a member of the American Society of Mechanical Engineers, Georgia Society of Professional Engineers, and National Society of Professional Engineers.

Prior to establishment of the Boiler Equipment Service Co., he founded the Brooks-Fisher Co. and was instrumental in organizing several other industrial companies.

American Blower Officers

J. C. Linsenmeyer was recently elected President of the AMERICAN BLOWER CORPORATION, a Division of American Radiator and Standard Sanitary Corporation, to succeed the late Clark T. Morse. At the same time, John W. Brennan was elected Vice President of Engineering.

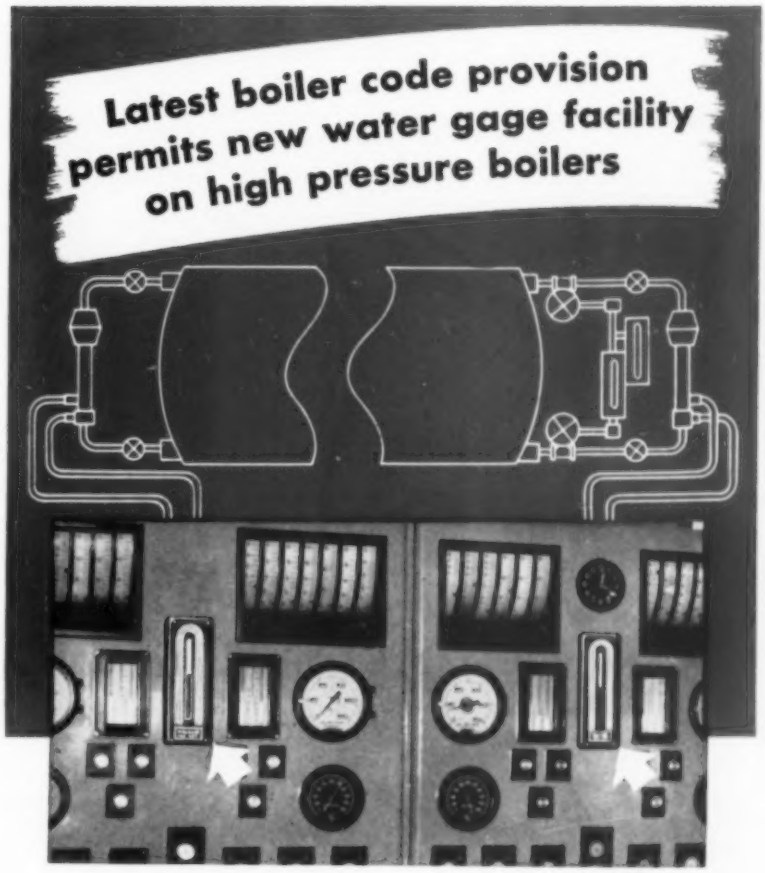
E. C. Marshall, Pres., Duke Power Co., Dies

EDWARD C. MARSHALL, President of Duke Power Company, died at his home in CHARLOTTE, N. C., Sept 21. Mr. Marshall, a native of Virginia, had been associated with the Duke interests since 1907.

Chrysler Airtemp—N. C.

STERLING NICHOLSON, veteran Chrysler Airtemp air conditioning dealer of DURHAM, N. C., and president of the firm of NICHOLSON, INC., recently was appointed the first wholesale distributor of Chrysler Airtemp products in Airtemps new wholesale product distribution program.

Under the terms of the new agreement, the Southaire Company, a subsidiary corporation of Nicholson, Inc., will handle wholesale purchases, warehousing and retail distribution of Chrysler Airtemp heating and commercial and residential "packaged" air conditioning products in the Durham area. Nicholson, Inc., will continue to sell and install Chrysler Airtemp multi-ton central station air conditioning equipment in the area.



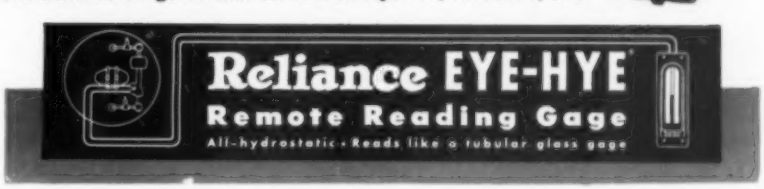
Now two EYE-HYE Remote Gages give you the required double check on pressures 900 lbs and over

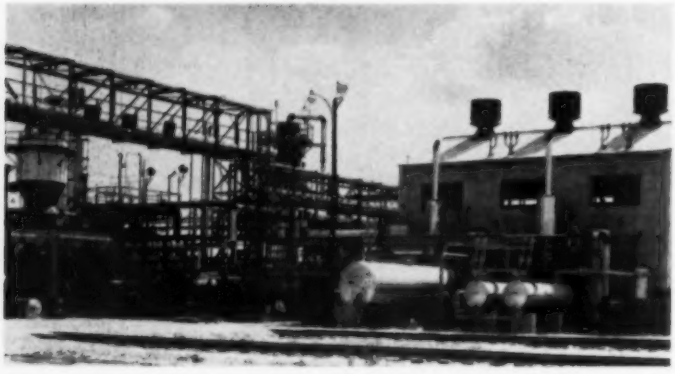
Two independent remote level indicators of the compensated manometric type may now be used instead of one of two gage glasses required on pressures 900 psi and over. You still must have one conventional type gage, maintained in serviceable condition, but it may be shut off while both remote indicators are in operation.

This is a tremendous advantage. It removes the need for checking high gages, maintaining mirrors or other water level reading methods. EYE-HYE's sharp, illuminated indication is frequently reported as more accurate than gages at the drum. Now the two gages required can be at eye height—convenient, safe—a true double check on the vital boiler water level.

For full details of the new code interpretation read Case No. 1155. For information about Reliance EYE-HYE, call your Reliance representative or write for Bulletin CO.

The Reliance Gauge Column Co. 5902 Carnegie Ave., Cleveland 3, Ohio





Mathieson Chemical Corporation's hydrazine plant at Lake Charles, Louisiana. Refrigeration and ammonia recovery at right, synthesis area in left foreground.

Hydrazine Plant—Lake Charles, La.

First large-scale plant to produce hydrazine. Product's industrial applications include drugs, insecticides, soldering fluxes, plastics, synthetic fibers and foam rubber.

BASED on ammonia, hydrazine is a highly reactive substance which first came into prominence near the end of World War II as one of the chemical fuels used in German rockets. It has since been produced in this country in limited quantities and has already found use in the manufacture of drugs, photographic chemicals, soldering fluxes, foam rubber, insecticides, plant growth regulators, metal-plating materials and boiler compounds.

In production since August, 1953, Mathieson Chemical Corporation's plant at Lake Charles, Louisiana, is the country's first plant to produce hydrazine on a tonnage scale.

Military requirements are expected to take most of the plant's initial output. Indications are that non-military uses will develop further in the near future and are expected in time to become significant in terms of total demand.

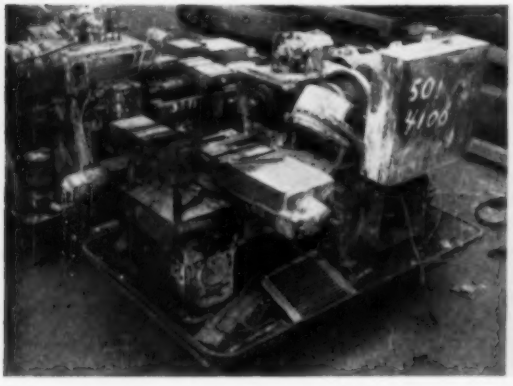
In the industrial field, hydrazine and its derivatives show promise as starting materials for new dyes, synthetic detergents, wrinkle-resistant coatings for textiles, and as modifiers of synthetic fibers and plastics, particularly those of the polyamide type such as nylon and Dacron. There is some evidence, for example, that hydrazine-modified fibers may permit finer strands with greater strength and elasticity.

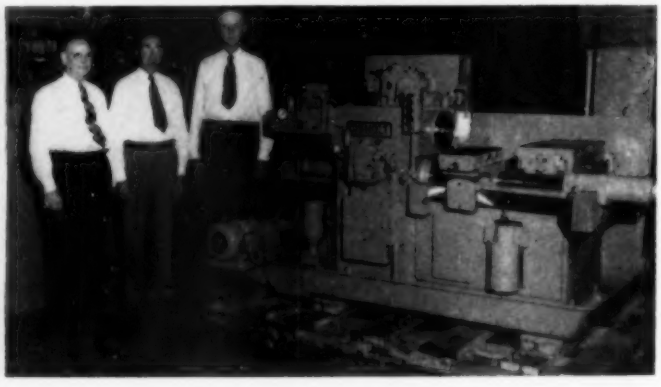
It is anticipated that production from Mathieson's new Lake Charles plant will give additional impetus to the development of new commercial chemicals based on hydrazine.

American Wheelabrator—Ala.

AMERICAN WHEELABRATOR & EQUIPMENT CORP., Mishawaka, Indiana, has appointed LEROY J. WIESCHAUS, District Manager of its sales office at 805-6 Farley Building, BIRMINGHAM, ALABAMA, which handles the company's complete line of products.

Mr. Wieschaus, a registered professional engineer, has been in the home office of the company for more than seven years, holding the positions of Market Research Engineer, Assistant Sales Promotion Manager, and Abrasives Engineer.





Alabama Sub-Contractor Speeds Rebuilding of Damaged Lathes

Over 50 Gisholt No. 12 Hydraulic Automatic Lathes were involved in the Detroit Transmission fire last August. The machine shown here was rebuilt by CONTINENTAL GIN COMPANY of Birmingham, Alabama; and is typical of those which had to be completely disassembled, cleaned and inspected. Rebuilding had to be fast, accurate, and meet new machine performance standards.

Rebuilding of the machine was completed just three weeks to the day after the photo at left was taken. Shown with the rebuilt machine are (left to right): CARL LEWIS, Master Mechanic of Cadillac; GEORGE M. CLASS, Vice President in Charge of Engineering of Gisholt; and MERRILL PRATT, President of Continental Gin.

Tube Turns—Houston

RICHARD T. BURKE, sales engineer, has been added to the HOUSTON staff of TUBE TURNS, INC.

Burke was born in Louisville and attended Massachusetts Institute of Technology. He joined Tube Turns, Inc., in 1949 and originally was stationed at Midland, Texas.

Wm. Powell Co.—Houston

THE WILLIAM POWELL COMPANY, Cincinnati, Ohio, has announced the appointment of KEMP PIERCE and TOM WILLIAMS as sales engineers for the company's valves in the HOUSTON, TEXAS, office. Mr. Pierce, formerly associated with the Gray Tool Company, is a graduate of the University of Houston. Mr. Williams was graduated from Louisiana State University.

Coyne Opens Atlanta Services Facility for Manufacturers

ERNEST S. COYNE, a Georgia Tech graduate with several years' experience in engineering fields in the South and Southwest, announces the opening of a firm known as ATLANTA SERVICES FACILITY, P. O. Box 7182, Station C, ATLANTA, GEORGIA.

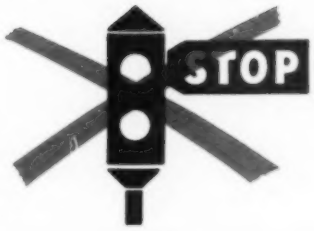
The company is prepared to offer branch office representation to manufacturers in matters involving customer relations, personnel screening, development of sales leads, on-the-spot handling of complaints, and related work, exclusive of actual sales.

Mr. Coyne, who has a degree in Industrial Management, is a member of the Society of Fire Protection Engineers, American Society of Safety Engineers, and the National Fire Protection Association.

Notre Dame Council Names Lynch of Atlantic Steel

ROBERT S. LYNCH, president of ATLANTIC STEEL COMPANY, ATLANTA, has been given the honor of being placed on the Advisory Council for Science and Engineering at the University of Notre Dame. He is the first man from the Southeast to be named to this council.

The Advisory Council for Science and Engineering was formed in 1946 and is comprised of men who are outstanding in their respective fields of endeavor. Through the Council, they take their ideas and experience to the University, thereby developing a closer relationship between education and business and industry, especially in the technical fields.



Pacific PUMPS

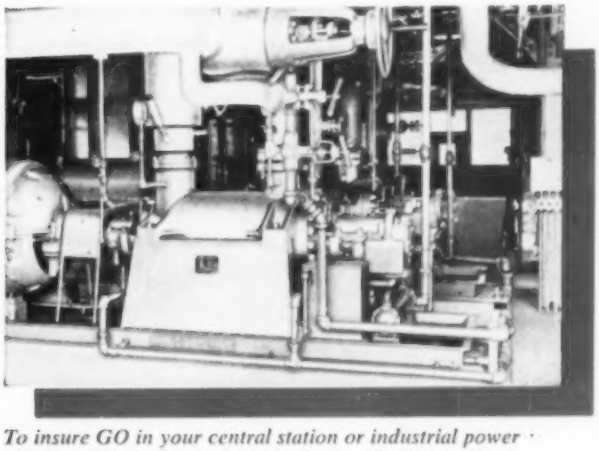
Eliminate Stop Signs...

Provide Constant

Power Generation Traffic!

Electric power generation and transmission are geared to continuous, indefinite operation. A vital link in keeping this electrical energy on the GO is Pacific boiler feed pump installations – both operating and standby. For more than two decades, Pacific has built feed pumps for this exacting service in central stations and industrial power plants on four continents.

Sizes installed range from the midgets of less than 50,000 lbs. per hour to the giants having a capacity of 1,000,000 lbs. per hour. The operating discharge pressures range from 200 to 2500 psig. More than 50 units are operating at discharge pressures above 2000 psig.



To insure GO in your central station or industrial power plant, specify boiler feed pumps by Pacific Pumps, Inc. For more information, write for Bulletin 109.

PACIFIC *Precision Built* PUMPS

Pacific Pumps inc.

ONE OF THE DRESSER INDUSTRIES

HUNTINGTON PARK, CALIFORNIA

Export Office: Chanin Bldg., 122 E. 42nd St., New York

Offices in All Principal Cities

BF-18

Elgin and Refinite Merge

REFINITE SALES COMPANY, Omaha, Nebraska, has joined forces with ELGIN SOFTENER CORPORATION, Elgin, Illinois. Both are pioneers in the water conditioning field, and the combined products of these firms comprise a complete line of water conditioning equipment and water treating chemicals.

Tri-State Expands—Ky.

Opening of a plant in OWENSBORO, KY., has been announced by the TRI-STATE PLASTIC MOLDING CO., INC., Henderson, Ky.

ROBERT K. GIBBS, president, said that opening of the new plant releases space in the Henderson buildings for use by the firm's expanded die casting operations.

5 REASONS WHY...

BLAW-KNOX *ELECTROFORGED*® GRATING IS YOUR BEST BUY

—▶STRENGTH
—▶SAFETY
—▶LOW UPKEEP
—▶LONG LIFE
—▶SELF-CLEANING

We factory-fit this one-piece Open Steel Flooring to your dimensions for easy installation. You can cover dangerous open areas and add useful space inside and out.

USE COUPON FOR DETAILS AND PRICES

BLAW-KNOX COMPANY
GRATING DEPARTMENT
BLAW-KNOX EQUIPMENT DIVISION
P.O. Box 1198, Pittsburgh, Pa.

Please send prices on ..... sq. ft. Grating as per specifications marked at right.
Please send prices on ..... Type ..... Stair Treads ..... inches wide.
COMPANY _____
INDIVIDUAL _____
STREET _____
CITY _____ ZONE ____ STATE _____

BLAW-KNOX *ELECTROFORGED*® STEEL GRATING

Reliance Appoints Blackwell to Charlotte, N. C. Office

RELIANCE ELECTRIC AND ENGINEERING COMPANY, manufacturer of electric motors and motor drives for industry, has announced the appointment of L. E. BLACKWELL, JR., to its sales office at 1208 Liberty Life Bldg., CHARLOTTE, N. C., as sales application engineer. FRANK W. LEITNER is branch manager.

Marley Co. Appoints Cameron

J. A. CAMERON has been appointed executive vice-president and assistant general manager of THE MARLEY COMPANY, KANSAS CITY, MO., manufacturer of water cooling towers and other cooling equipment for industry and air conditioning.

Mr. Cameron has been with the company since 1937, at which time he served as a sales engineer in their New York office. Subsequently he was promoted to New York sales manager, and to Eastern Regional Manager, in which position he has served until his recent appointment. In 1944, he was made vice-president of the company and later was elected to the board of directors.

Bird & Son S. C. Plant

BIRD & SON, INC., East Walpole, Mass., will build a $2,250,000 roofing plant and granule plant at CHARLESTON, SOUTH CAROLINA, at Stark Industrial Park on the Ashley River. Construction will start in the fall and the plant is expected to be in operation by next summer.

It will employ 150 people and will serve the Southeast, particularly the Carolinas, Virginia, Tennessee, Georgia, Florida and part of West Virginia.

It will have all the latest refinements for fast and efficient production of a full line of quality asphalt shingles and roll roofings. The plant will also produce plastic cements and roof coatings. The building to house the equipment will have a floor area of more than 100,000 sq ft. Included in the plans is a warehouse with 42,000 sq ft of storage area.

Adjacent to the roofing plant, a granule plant of 6000 sq ft is being built. This will crush and color the surfacing material for shingles and roll roofings. A boiler plant is also being constructed. Space has been provided for future plant expansion when required.

Norton Co.—Louisville

GERALD H. LUSHER has been appointed a refractories engineer by NORTON COMPANY, Worcester, Mass. He has been assigned a new territory centered around Louisville and Cincinnati, including KENTUCKY, TENNESSEE, GEORGIA, ALABAMA and MISSISSIPPI.

Clark Equipment—S.E.

JOHN J. SHAND, Southeastern Regional Sales Manager of the CLARK EQUIPMENT COMPANY, has moved his headquarters from Norfolk, Va., to 161 Spring Street Building, ATLANTA, GA.

John J. Shand

The Southeastern Division includes the states of GEORGIA, ALABAMA, FLORIDA, NORTH CAROLINA, SOUTH CAROLINA, VIRGINIA, TENNESSEE and MARYLAND.

Frank G. Hough—South, SW

THE FRANK G. HOUGH CO., Libertyville, Ill., has appointed two new district representatives to work with distributors in the sales and promotion of the company's tractor-shovels and tractors.

JACK C. BEVER will operate in the DISTRICT OF COLUMBIA, MARYLAND, VIRGINIA, WEST VIRGINIA, and the CAROLINAS.

DWAIN RICHEY will travel in ARKANSAS, LOUISIANA, OKLAHOMA, TEXAS, and NEW MEXICO.

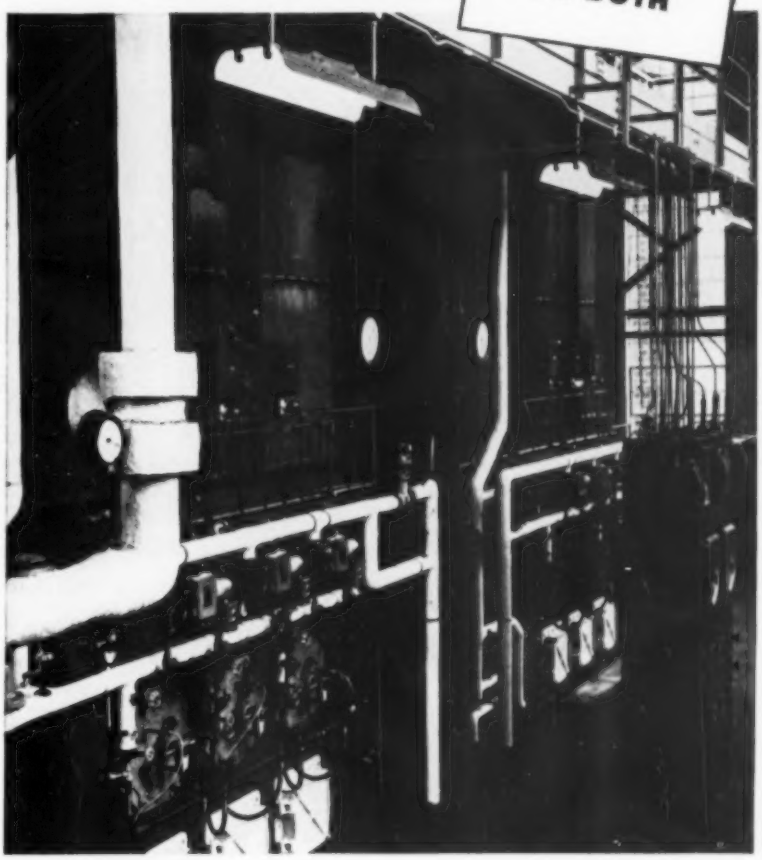
Allis-Chalmers—Georgia

THE HALSMITH COMPANY, 403 W. Ponce de Leon Ave., DECATUR, GA., has been named a distributor for ALLIS-CHALMERS motors, control and Texrope drive equipment in the northern part of Georgia.

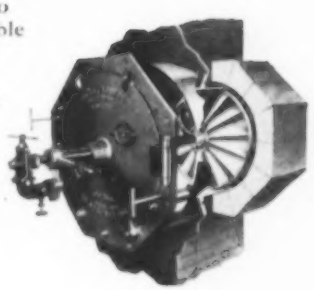
ROY S. SMITH and JOHN HALPIN are partners in the newly appointed company.

ENCO BURNERS

FOR OIL, GAS OR BOTH



This New England textile mill uses Enco Type K oil burners. When gas is available a gas-burner gun can be added for dual fuel firing.
Combustion in any case is uniform even if steam demands fluctuate suddenly—another economy feature.
This is only one example of economy with Enco Burners—made in sizes and types for every power plant need, including those with very wide load swings. Ask for literature or a special recommendation for your specific, individual oil or gas burner needs. We will give it the benefit of 35 years' experience in solving unique burner problems.



Enco type K oil burning unit

EC-480

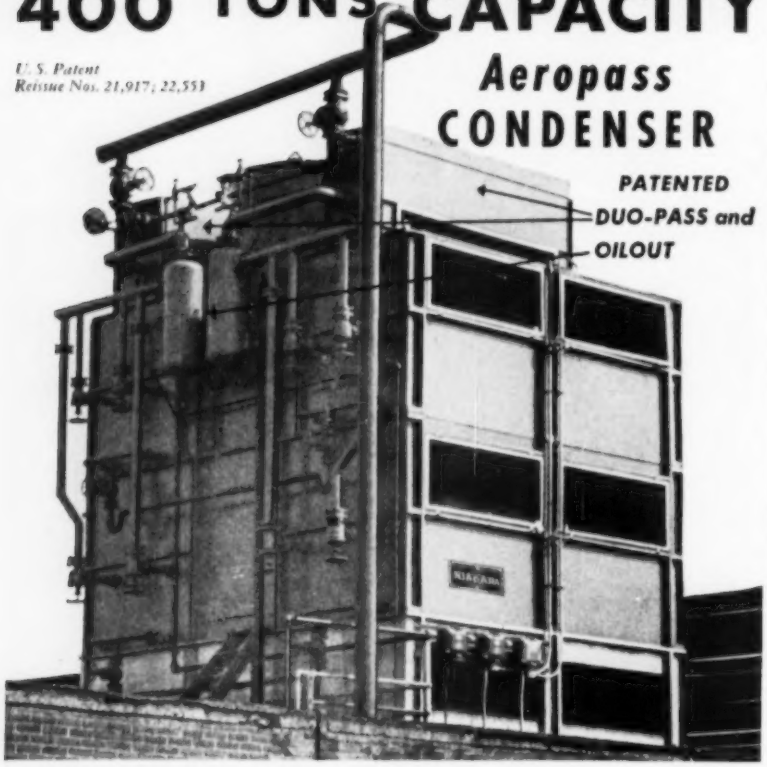
THE ENGINEER COMPANY
75 WEST STREET, NEW YORK 6, N. Y.
IN CANADA: ROCK UTILITIES LTD., 80 JEAN TALON ST. W., MONTREAL, P. Q.

400 TONS CAPACITY

U. S. Patent Reissue Nos. 21,917; 22,553

Aeropass CONDENSER

PATENTED DUO-PASS and OILOUT



YOU USE LESS POWER...
SAVE CONDENSER WATER...
SAVE UPKEEP COST

For large refrigeration systems, NIAGARA gives you a choice between a battery of condensers (that may be cut on or off with the load) or a high capacity condenser that saves space.

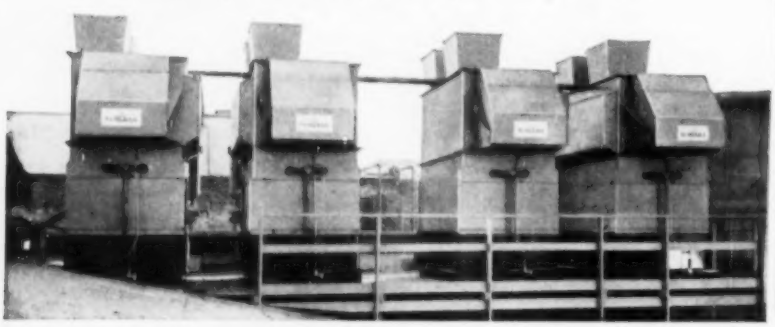
Both have the patented "Duo-Pass" and "Oilout" that remove superheat and keep the system free of oil. Results: you save one-third or more of power cost and upkeep expense. Niagara Patented Balanced Wet Bulb Control gives lowest head pressure operation automatically. *Write for Bulletin 111.*

NIAGARA BLOWER COMPANY

Over 35 Years' Service in Industrial Air Engineering

Dept. SP, 405 Lexington Ave. **New York 17, N. Y.**

Field Engineers in Principal Cities of U. S. and Canada



Tube Turns—Houston Branch

TUBE TURNS, INC., LOUISVILLE, KY., manufacturer of welding fittings and flanges, has established a branch plant at 7120 Katy Highway, HOUSTON, TEXAS, to provide special service to the Southwest's petroleum industry. The plant also serves as a rail and truck terminal, and provides a strategic breakup point for carload shipments made from Louisville.

All operations are in charge of W. B. WHENTHOFF, district manager, with offices in the plant.

Timken Roller Bearing—Tex.

THE TIMKEN ROLLER BEARING COMPANY, Canton 6, Ohio, has announced the appointment of JOHN J. MCGRANN as manager of the HOUSTON, TEXAS office to replace Harry B. LILLEY who has been transferred to Detroit.

Mr. McGrann has been with Timken since 1945, and joined the Steel and Tube Division in Houston last year.

Westinghouse—W. Va.

Two new warehouses, one of 23,500 sq ft and the other of 17,000 sq ft, will be built by the WESTINGHOUSE ELECTRIC CORPORATION at their FAIRMONT, W. VA., lamp plant. Part of the Lamp Division's program to increase storage facilities in all key centers, the new warehouses will be used for storage of fabricated glass.

To be constructed of corrugated metal, the new buildings will cost approximately $165,000.

TCI Promotions

Personnel changes in the Sales Department of UNITED STATES STEEL'S TENNESSEE COAL AND IRON DIVISION have resulted in the promotion of three employees, it was announced by David A. Challis, Jr., vice president in charge of sales.

ROY C. RHODES, formerly manager of sales at the MEMPHIS, TENN., district sales office, has been made manager of sales at HOUSTON, TEXAS. He succeeds FREDERIC C. BUCK, who has retired after 44 years of service with United States Steel.

Transferred to Mr. Rhodes' former position in Memphis is THOMAS W. BENTON, JR., who has been serving as manager of sales at NEW ORLEANS. WALTER V. JONES moves up from the position of salesman at Dallas to the sales managership at New Orleans.

Delta Power Tool—Sou. Div.

HUBERT R. CARLSON, 1000 N.W. 49th Street, Oklahoma City, Oklahoma, has been appointed Regional Zone Manager of the Southern Division of ROCKWELL MANUFACTURING COMPANY'S DELTA POWER TOOL DIVISION. Mr. Carlson will make his headquarters at the ATLANTA, GEORGIA, offices of Rockwell's Meter & Valve Division.

Clark Equipment—W. Va.

THE CLARK EQUIPMENT COMPANY, Buchanan, Mich., has appointed the CRUNKLETON COMPANY, 5324 McCorkle Avenue, S.E., CHARLESTON, W. VA., as a distributor of Clark's full line of materials handling equipment, including fork-lift trucks, towing tractors, powered hand trucks, and Ross Carriers. The new dealership is under the management of LESLIE D. CRUNKLETON, JR.

Durkee Expands—Georgia

An addition to the refrigeration facilities of DURKEE FAMOUS FOODS at its MACON, GA., margarine and mayonnaise plant has been completed by The Rust Engineering Company, designer-constructor.

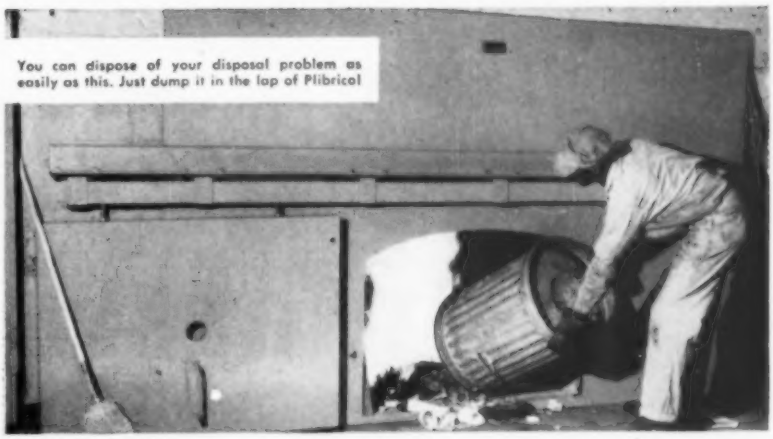
Provisions for the expansion were made in 1948 when Rust built the $2,500,000 margarine plant for Durkee, a division of The Glidden Company, Cleveland, Ohio. At that time one end of the main plant building was constructed to allow for later expansion.

Dixie Engineering Co. Names Whitney—Alabama

DIXIE ENGINEERING COMPANY, BIRMINGHAM, ALABAMA, announces the appointment of RICHARD WHITNEY as sales engineer.

Mr. Whitney is a graduate of Norwich University. After serving in the armed forces he was employed by Akron University as Project Engineer in the development of synthetic rubber. Over the past five years he has been engaged in sales and service work in the states of Alabama, Georgia, Mississippi and Tennessee.

Dixie Engineering Company represents some of the largest and most experienced manufacturers of mechanical equipment, fire protection equipment, and safety equipment, such as American-LaFrance-Foamite Corporation, Cardox Corporation, Dollinger Corporation, Arthur A. Olson, Aerco Corporation and Harvey P. Bertram Company.



Clean-cut way to solve a dirty problem

The Plibrico way is the efficient way, the recognized way, the long-lived economical way to wipe out that rubbish burning problem. Your own, clean-burning efficient Plibrico Incinerator calls a final halt to the fire hazard and smoke nuisance of open fires . . . or the mess and inefficiency of attempting to burn rubbish in the boiler furnace . . . or the excessive cost of hauling rubbish away and the unsanitary accumulation of rubbish between haulings.

The broad Plibrico Incinerator line has grown out of Plibrico experience as the nation's largest manufacturer of refractory specialties. There is a type and kind for every need — from smallest to largest and for every kind of refuse. The Plibrico steel-cased Standard Rubbish Destructor illustrated is typical of incinerators that are being used in hundreds of plants to dispose of general industrial refuse.

This incinerator is engineered for the rapid burning action of readily combustible material. Direct gas flow and adequate stack area avoid the danger of smoke and flame belching back from fire doors. A deflecting arch behind the bridge wall provides the long flame travel essential to smokeless combustion.

COMPLETE ERECTION SERVICE

This Plibrico Rubbish Destructor is available in four standard sizes to meet practically all plant requirements. You can have a Plibrico Incinerator erected by your local Plibrico Sales & Service distributor. Ready-to-operate portable incinerators are available for smaller requirements.

Plibrico Company

1938 Kingsbury St., Chicago 14, Ill.

PLIBRICO SALES & SERVICE IN PRINCIPAL CITIES

REFRACTORY PRODUCTS • ENGINEERING • CONSTRUCTION

Okadee "THE PERFECT SEAL" WRING FIT

No magic . . . No magnetism . . . lapped wring fit of every Okadee Valve disc and seat must pass this test of a perfect sealing surface. (unretouched photo)

. . . Here's What it Means to You in Terms of Valve Service

Flat mating surfaces within .000005", or less, of every set of Okadee valve discs and seats mean absolute shut-off of any material from ammonia gas to asphalt.

How long does this seal last in service? We honestly don't know. Tests under working conditions with propane were stopped after 269,000 operating cycles when no wear or seal failure could be detected. And Okadee valves do not have to be babied in service on corrosive or abrasive materials . . . Thousands of boilers have had Okadee blow-down valves in continuous, trouble-free service for fifteen years or more. If Okadee size-pressure-temperature ranges include your valve applications, Okadee installation will end your problems of valve performance once and for all.

Okadee valves are available in single-disc (one direction) and double-disc (two directions) types; screwed or flanged; ½" to 6" in standard A.S.A. dimensions; steel or semi-steel bodies (other materials to order); stainless steel or stellite seat facings; levers, rack-and-lever, worm-gear, hydraulic, pneumatic, automatic on-off control.

Write for Bulletin 332-H today!

OKd. Okadee COMPANY
332 South Michigan Avenue • Chicago 4, Illinois

new equipment (continued)

For more data circle item code number on the postage free post card—p. 17

(Starts on page 8)

Triple Scaling Tool

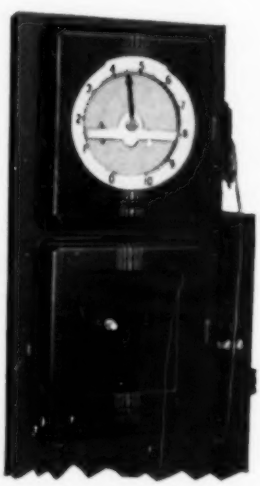
L-9 THOR POWER TOOL COMPANY, Aurora, Ill., has announced a new air-operated Triple Scaler, designed primarily for cleaning rust, paint and scale from boilers, tanks and structural steel.

The No. 326 Scaler has three piston type units which operate with a rotary motion to do three times the work of Thor's No. 26 single scaling tool which has an identical design.

Fitted with a lever cock valve, the scaler can be furnished with a lever type throttle similar to that used on Thor air drills. Its fast chipping action makes it ideal for cleaning inside of large castings.

Oxygen Recording Equipment

L-10 LEEDS & NORTHRUP COMPANY, 4934 Stenton Ave., Philadelphia 44, Pa., has available apparatus which is solving many oxygen measuring problems by providing a complete and concise oxy-



L&N oxygen recording equipment includes (1) a Thermo Magnetic Analyzer (2) a Speedomax recorder and (3) a sample conditioner engineered for efficient operation.

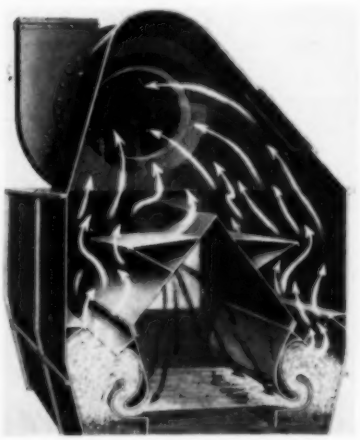
gen record at all times in various plant or process operations.

A high speed of response—initial, 8 to 12 seconds; 90% of final reading, 35 seconds—is provided by the equipment. L & N calibrated accuracy of ±0.15% oxygen against standard gas mixtures can be adjusted by means of recorder-dial rheostats to any plant standard. Effects of changes in ambient or sample temperature and pressure are cancelled out. Changes in background gases have little or no influence on the measurement.

No tank samples are needed, since calibration is checked against air. Low maintenance requirements have been accomplished by the development of fully automatic gas cleaning equipment for the sampling system. The design has eliminated filters wherever possible.

Dust Collector

L-11 THE AMERICAN AIR FILTER CO., INC., 215 Central, Louisville, Ky., has announced an improved hydro-static precipitator that separates the dust from the air by means of an S-shaped water curtain which has proved highly effective in collecting most types of process dust.



American Air Filter's Design 4, Type N Roto-Clone dust collector is available in three basic arrangements providing manual cleanout, continuous drain and sludge ejection by flight conveyors. Made in sizes for capacities from 1000 cfm to 48,000 cfm.

Among the improved features are: non-plugging water entrainment separators; heavier sludge ejector mechanism; wider range of sizes and capacities; and sectional construction to permit field conversion from one arrangement to another.

NEW Fairbanks
Series "23" Double Ball Race
SWIVEL CASTER

STRONGER ON EVERY POINT

The NEW Fairbanks Series "23" Double Ball Race Swivel Caster* line is designed for greater load carrying capacity in the medium duty field.

1 **NO KING-PIN** the No. 1 weak spot of ordinary casters. It's eliminated!

2 **"LOCK-WELD" CONSTRUCTION** Instead of being a separate piece, projection welding makes lower raceway integral with top plate. Retains perfect alignment!

3 **PATENTED LEG DESIGN** disperses shocks and overloads over a larger segment of raceways. Resists distortion. Lasts longer!

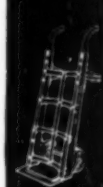
4 **LARGER SECONDARY RACEWAY AND BALLS** provide tremendously increased swiveling efficiency and greater shock absorption of overloads. Easier working!

5 **COINED RACEWAYS** insure smoother operation through extra hardness. Improve with use!

6 **PRESSURE LUBRICATION** by Zerk Fittings reduces friction and wear!

*PATENTED

Rigid Casters, Series "33" in matching heights



THE Fairbanks COMPANY
393 LAFAYETTE STREET • NEW YORK 3, N. Y.
Branches: New York 3 • Pittsburgh 22 • Boston 10 • Rome, Ga.

TRUCKS • VALVES • DART & PIC UNIONS • CASTERS

new equipment (continued)

For more data circle item code number on the postage free post card—p. 17

High Speed Power Sweeper

L-12

G. H. TENNANT COMPANY, 2566 N. Second St., Minneapolis 11, Minn., has developed a new power sweeper with which it is said that one man can do the work of a 3 to 12-man pushbroom crew.

Known as the "Model 75," this machine is said to sweep over 100,000 sq ft per hour in open areas. Fast mechanical dumping is a special new feature. With a few turns of a ratchet-type lever, the operator can tilt the fully loaded dirt hopper and dump loads.

The machine sweeps a 36 in. path; picks up dirt, litter and dust at speeds up to 6 mph. A rotary side-brush increases the sweeping path to 48 in. and allows cleaning flush with walls, curbs, fences, and under guard rails.

Sweeping is said to be practically dust-free. A high speed 36 in. brush, rotating inside a vacuumized compartment, hurls heavy debris and dirt into a 9 cu ft hopper. It scoops up metal chips, sand, sawdust, screws, nails, litter, etc. At the same time, a high volume 11 in. vacuum fan sucks lighter dirt and dust into a large fabric bag. The brush compartment is "sealed-to-floor" by a heavy, flexible rubber skirt so dust can't escape.

Fast mechanical dumping is the new feature of this Tennant Sweeper. 700-lb loads of debris can be dumped by one man in about 30 seconds.

GENERAL
REG. U.S. PAT. OFF.

RODA — High grade gas, by-product, steam and household stoker coal from Wise County, Virginia, on the Interstate Railroad.

DENDRON — High grade gas, by-product, steam and domestic coal from Wise County, Va., on the Interstate Railroad.

STONEGA — High grade, high volatile steam and by-product coal from Wise County, Va., on the Interstate Railroad.

GLENBROOK — The Premium Kentucky High Splint unmatched for domestic use. Produced in Harlan County, Kentucky, on the L. & N. Railroad.

COKE — Roda and Stonega from Wise County, Va.

CRITERION COAL — High grade gas, by-product, steam and domestic coal—Pittsburgh seam from Irwin Basin, Westmoreland County, Pennsylvania, on the Penna. Railroad.

HAMPTON COAL — High volatile domestic, steam and by-product coal from Boone and Logan Counties, W. Va., on the Chesapeake & Ohio Ry.

CROZER — Genuine Pocahontas from McDowell County, W. Va., on the Norfolk & Western Railway.

LYNCO — High fusion coking coal for by-product, industrial stoker and pulverizer use from Wyoming Co., W. Va., on the Virginian Ry.

ANTHRACITE
Hazel Brook—*Premium Lehigh*
Raven Run—*Premium Mahanoy*
Cross Creek—*First Grade Lehigh*

Our engineering service, available upon application, and long and varied experience is your assurance of the Right Coal — Properly Applied.

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123 SOUTH BROAD STREET PHILADELPHIA 9, PA.
CABLE ADDRESS, GENCO
Branches:
BLUEFIELD, W. VA. BUFFALO CHARLOTTE, N. C. CINCINNATI
CLEVELAND IRWIN, PA. NEW YORK NORFOLK

"Mite-Size" Steam Boiler

L-13 CYCLOTHERM DIVISION UNITED STATES RADIATOR CORPORATION, Oswego, N. Y., has announced a 50 hp fire tube steam boiler which requires less than half the floor space and about 2 feet less head room than other steam generators of equal boiler horsepower.

Through use of the patented Cyclonic Combustion principle, the new power package takes up an area of only 20 sq ft, is 4 ft 8¼ in. high. It requires no cement foundation or stack. A simple flue vent is all that is necessary to operate at about 80% efficiency.

The mite-sized package is designed for installations where space is limited; or to replace older, larger boilers of lower horsepower without expensive structural changes in physical plant. Multiple unit installations can be made, giving a flexibility impossible through use of a single boiler of higher output.

Pressure Reduction Valve

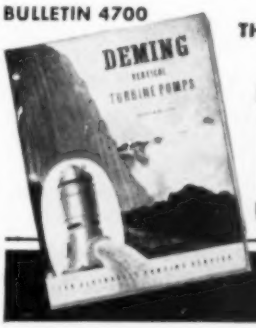
L-14 HELCO PRODUCTS CORPORATION, 2041 Colorado Ave., Santa Monica, California, has developed the Automatic Liquid Level Control, a valve primarily designed to maintain a very low and sensitive outlet pressure.

The valve can be adapted to many uses in diverse types of equipment where a steady water or other liquid level is to be maintained automatically. It takes the place of float valves, wherever a closed system is desirable because of sanitary requirements or corrosive conditions. The control operates in a range of inlet pressure from 5 to 260 psi and can be set to maintain a steady water level in a range from 5 to 20 in.

MORE WATER
AT LESS COST
with a
DEMING TURBINE PUMP

Installed in 1940, the Deming Vertical Turbine Pump (illustrated above) has supplied a well-known manufacturer with millions of gallons of water with no interruptions due to pump failures. This dependable unit delivers an average of 550 gallons of water per minute from an 8-inch well, 600 feet deep and against a 110 foot head. Deming Vertical Turbine Pumps are built of standard components. Each pumping unit is individually engineered for specific operating conditions. Pumps are available in either the water lubricated type for wells from 4 to 16 inches I.D., or in the oil lubricated type for wells from 6 to 14 inches I.D. Capacities range up to 3500 gallons per minute. For complete details about Deming Vertical Turbine Pumps, consult your Deming Distributor or write for BULLETIN NO. 4700.

BULLETIN 4700



THE DEMING COMPANY • 549 Broadway, Salem, Ohio

Deming PUMPS

new equipment (continued)

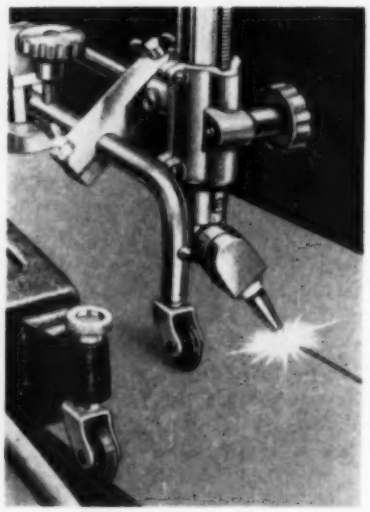
For more data circle item code number on the postage free post card—p. 17

"Floating" Bevel Torch

L-15 NATIONAL CYLINDER GAS COMPANY, 840 N. Michigan Ave., Chicago 11, Ill., has introduced a new "Floating Torch" assembly which permits uniformly accurate bevel cutting regardless of humps, bows or other unevenness in steel plate.

Designed for use with the company's "Cut-O-Matic" portable cutting machine, the new unit has two principal parts: a guide wheel which rests on the plate being cut, and controls the distance between the torch tip and the plate; and the newly designed bevelling torch.

The "Cut-O-Matic" to which the torch is attached is a motor driven cutting machine weighing less than 50 lb. It cuts straight lines, circles, arcs, rings, strips and various irregular shapes. It can be used on steel plate, slabs and pipe. It will cut thickness up to 7 in. with a standard two-hose torch and up to 16 in. with a special three-hose torch. Special adaptations of the machine are used for automatic gas welding and heating operations.



Guide wheel automatically raises or lowers torch to compensate for surface irregularities; torch has swivel head and can be rotated to cut whatever angle of bevel is required.

Light Oil Fired Warm Air Space Heater

L-16 DRAVO CORPORATION, Heating Department, Machinery Division, Pittsburgh, Pa., announces a new light oil fired warm-air heater known as the "Paraflo" Space Heater, available in Model 20 with 200,000 Btu/hr output and Model 25 with 250,000 Btu/hr output.

Tests show an efficiency in excess of 80%, resulting from the two-pass flame travel in a stainless-steel combustion chamber and passage of the hot gases through an economizer section.

Supporting straps hold the combustion chamber in position regardless of whether the heater is mounted vertically or horizontally, yet one end is free to move as the metal expands and contracts.

The air circulating fan takes in air at floor level, directs it around the combustion chamber, through the economizer section and out through two 12 x 12 inch directional nozzles. The nozzles can be rotated 360 degrees thereby directing warm heated

YOU NEED THIS

LINE ANY INSTALLATION
CAST ANY SPECIAL SHAPE
in your plant anytime with worthwhile savings
IRONTON CASTABLES
FOR SERVICE FROM 0° TO 3000° F.
IRONTON INSULATES

HELPFUL INFORMATION ON WAYS TO HANDLE YOUR REFRACTORY INSTALLATIONS

Brick is giving way to monolithic refractory installations for the sake of speed and economy. Now you can build structures quicker . . . when you want them . . . with your own day labor. Ironton's Bulletin 104 shows how ***IRONTON INSULATES*** and ***IRONTON CASTABLES*** do the job. Nine new refractory concretes are **HEAT-CODED** to make it easy to select the right Ironton product. Get all the facts from your nearest office, or write to Ironton today.

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FOR YOUR COPY

THE IRONTON FIRE BRICK COMPANY
RELIABLE REFRACTORIES
IRONTON, OHIO

Representatives in the South:

Baltimore, Md. - MUlberry 7184
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Chattanooga, Tenn. - Phone 7-6697
Jacksonville, Florida - Phone 3-5586
Miami, Florida - Phone 82-5782
Silver Spring, Md. - JUniper 7-5468
Kentwood, La. - - Phone 2191

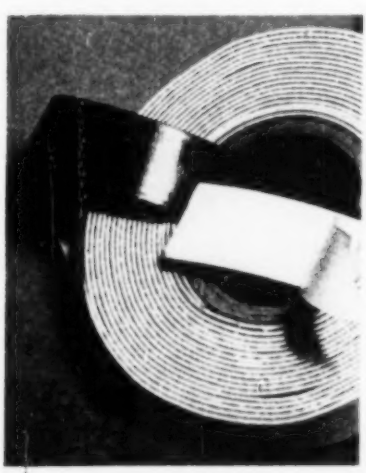
Dravo's Paraflo space heater burns up to and including No. 2 fuel oil. Air circulating fan is interlocked with the oil burner, and other automatic features shut down the burner in case of flame, power or motor failure.

air to any desired location. The unit is also suitable for connecting into duct systems.

Cable Splice Rubber Tape

L-17 CSI SALES COMPANY, Solon Center Bldg., Solon, Ohio, announces the availability of CSI Cable Splice Rubber Tape for the utility, power, and industrial fields.

Important features are imperviousness to copper through special blending; 19,000-volt dielectric strength; acid resistance, and anticorrosive effect. The tape has an elongation factor of 600% together with a tensile strength of over 19 lb per in. width.



Cohesive properties of the waterproof tape, according to CSI Sales Company, make it possible to apply it lengthwise by pinching. Many wire splice jobs can thus be handled without winding.

DIXISTEEL
TRADE MARK
BARS AND SHAPES

QUALITY MADE
FROM QUALITY STEEL

DIXISTEEL merchant bars are quality-controlled from start to finish. At each step of production — from molten steel to the finished hot-rolled product — checks and rechecks are made to assure proper physical properties, finish and tolerances.

DIXISTEEL Bars and Shapes are produced in a wide variety of shapes, sizes and grades — plain or galvanized.

Write today for complete information and prices.

Atlantic Steel Company
ATLANTA, GEORGIA

Producers of fine-quality low-carbon steel products, including: hot rolled bars, shapes and strip • drawn wire • nails, rivets, staples • fence and barbed wire • fabricated reinforcing bars • forgings and stampings

new equipment (continued)

For more data circle item code number on the postage free post card — P. 17

Combination Oxygen & Combustibles Analyzer

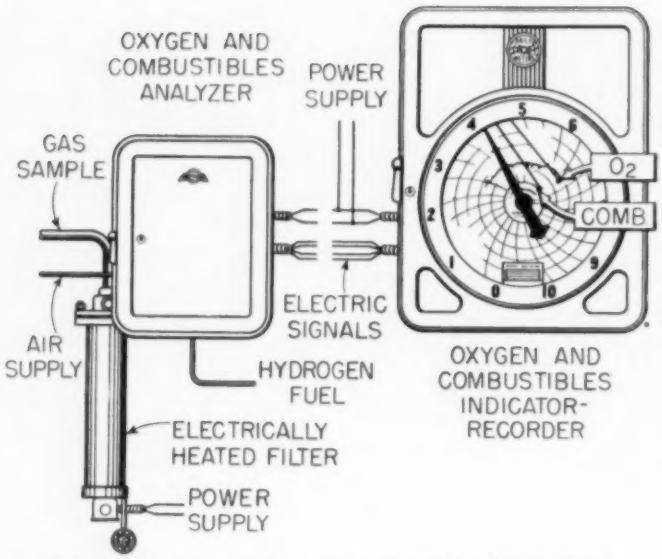
L-18

BAILEY METER CO., 1050 Ivanhoe Road, Cleveland 10, Ohio, is offering a completely new, combination Bailey Oxygen and Combustibles Analyzer which provides vital operating information on combustion performance.

This gas analyzer can (1) help save fuel dollars, especially where multi-fuels or fuels of varying composition are fired, and (2) act as a safety guide to prevent the lighting off of unpurged, gas-fired combustion chambers.

Analyses of $\%O_2$ (an index of excess air) and % combustible (an index of fuel-air mixing performance) are offered for the first time in a single, compact unit. The gas analyzer and its recorder indicate or automatically control the necessary adjustments required to maintain maximum combustion efficiency within combustion equipment limitations.

Minimum range, 0-5%; maximum range, 0-25% . . . uses compressed air and H_2 for catalytic combustion . . . noble metal filaments with thermal conductivity compensators are part of null balance bridges . . . accurate within $\pm 0.25\%$ by volume of O_2 and combustibles contents in sample.



Bailey Meter Company's oxygen and combustibles analyzer.

Spherical Tanks on Tubular Towers

THE COLE Spherical Tank on Tubular Tower is unique in its field. We design and erect special tanks of this character. It provides an attractive and serviceable unit—economical to maintain, efficient in service and pleasing in appearance.

Write for special booklet on these modern, welded Spherical Tanks which provide gravity water pressure, and for copy of *latest Cole catalog, "Tank Talk."*

Established 1854

R. D. COLE MFG. CO.
NEWNAN, GEORGIA

ELEVATED TANKS • VESSELS • CYLINDERS
TOWERS • BINS • STANDPIPES

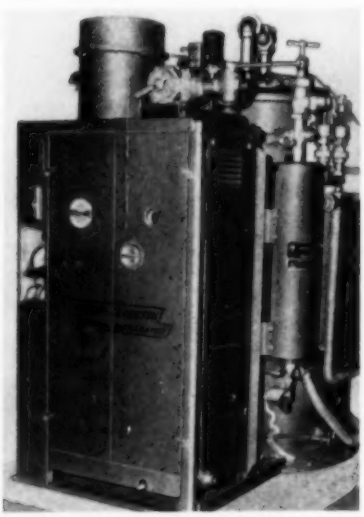
For more data circle item code number on the postage free post card — P. 17

One Switch Fuel Conversion in Packaged Steam Generator

L-19 VAPOR HEATING CORPORATION, 4501 W. 16th St., Chicago 23, Ill., has developed a new steam generator that can change from fuel-oil to natural gas fuel by flipping one switch and without interrupting steam output.

The fuel-oil spray nozzle is incorporated into the metal body of the gas burner. When the fuel selection switch is flipped from natural gas to oil, the motorized gas valve closes and the fuel-oil solenoid valve opens, releasing oil under pressure to the spray nozzle. Fuel oil is always ready to be released to the combustion chamber because it is continuously circulated through the steam generator's hydraulic modulating controls. A constant spark and pilot light insure positive lighting.

This steam generator is a complete package which includes the 7½ hp electric motor, blower, feedwater pump, steam separator, steel coils, and all the controls, in a cabinet. A fork lift truck can pick up this unit which weighs about 6,000 lb and is about one-fourth the size of a conventional type boiler. No special building or walled-in area is necessary as these units cannot blow up because there is no reservoir of water heated under pressure.



Vapor-Clarkson's Model OKJ-4740 develops full working steam pressure up to 300 lb in less than 3 min. from cold water, and makes 1500 to 5000 lb of steam per hour.

these LITTLE DIFFERENCES mean

BIG ADVANTAGES when you specify

CAMBRIDGE INDUSTRIAL WIRE CLOTH

#1. Some manufacturers assign only one operator to as many as ten looms. But here at Cambridge, we have a specially trained operator for every single loom in the plant. Just a little difference . . . but a BIG advantage in accurate mesh count and constant screen width.

#2. Some wire cloth producers can work in only a certain few metals or in a limited range of mesh sizes. Here at Cambridge we can weave cloth from any metal that can be drawn into wire . . . our range of sizes runs from 20 x 250 mesh up to 4 inch openings . . . a BIG advantage for customers with varied needs.

#3. Some manufacturers are not equipped to fabricate wire cloth into special forms, for example, filter leaves. But here at Cambridge, we can supply wire cloth in bulk or in practically any type of fabricated part . . . a BIG advantage that saves you time and money by providing one source for both weaving and fabrication.

These are just a few reasons why it will pay you to investigate Cambridge for your wire cloth needs. Call in your Cambridge Field Engineer to get the full story . . . and he'll gladly quote on your next order. Write direct or look under "Wire Cloth" in your classified telephone book.

FREE CATALOG! Gives full range of mesh sizes and types of cloth available from Cambridge, also valuable metallurgical data. Write for your copy today.

The Cambridge Wire Cloth Co.

WIRE CLOTH | METAL CONVEYOR BELTS | SPECIAL METAL FABRICATIONS

Department Y
Cambridge 12, Maryland

OFFICES IN PRINCIPAL INDUSTRIAL CITIES

"THIS LUBRICANT INCREASED BEARING LIFE FROM 2 WEEKS TO 2 YEARS"

—says THE GLOBE COMPANY

"Animal acids and moisture, most harmful to ball and roller bearings prevails in the entire meat packing industry. With conventional lubricants, some of the bearings in our Roto-Cut machines did not last two weeks. Since using Ball Bearing LUBRIPLATE in machines operating continuously 24 hours a day for over two years, we have not had a single bearing replacement."

For nearest LUBRIPLATE distributor, see Classified Telephone Directory. Send for free 56-page "LUBRIPLATE DATA BOOK"... a valuable treatise on lubrication. Write LUBRIPLATE DIVISION, Fiske Brothers Refining Co., Newark 5, N. J. or Toledo 5, Ohio.

REGARDLESS OF THE SIZE AND TYPE OF YOUR MACHINERY, LUBRIPLATE LUBRICANTS WILL IMPROVE ITS OPERATION AND REDUCE MAINTENANCE COSTS.

new equipment (continued)

For more data circle item code number on the postage free post card — P. 17

Variable Troughing Belt Conveyor Idler

L-20 LINK-BELT COMPANY, 307 N. Michigan Ave., Chicago 1, Ill., has introduced a new variable troughing belt conveyor idler, designed to provide smooth belt transition between troughing idlers and flat pulley.

Idler is available in two types: Link-Belt Series 100, designed for belts carrying all but the heaviest and coarsest materials, in seven belt widths from 24 to 60 in.; and Series 200, for belts carrying the heaviest and coarsest materials, in six belt widths from 36 to 72 in.

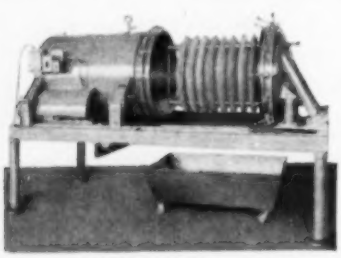
The angle of inclination of the concentrator rolls is adjustable from 20 degrees to fully horizontal. This permits a gradual flattening of the belt as it approaches the head pulley, thus minimizing stresses and resulting in longer belt life.

Although designed with regard to possible savings in certain thicker and costlier belts, such as the steel cord belts, these idlers are helpful in many types of belt conveyor installations.

Retractable Tank Filter

L-21 SPARKLER MFG. CO., Mundelein, Ill., has announced a new fast action heavy duty retractable tank filter.

It can be opened with all plates exposed in 60 seconds. Filter can be cleaned by jet spray wash off, backwashing or a combination of both, or



Sparkler Mfg. Company's 1,000 sq ft Model MCR Retractable Tank Filter. Units are available in capacities of 100 to 2000 sq ft of filtering surface.

MARTINDALE

MODEL 52 V.A.O. TESTER

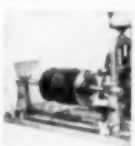
This new, sturdy, portable instrument has 5" meter—Four testing ranges: Volts, AC and DC: 0-2.5, 0-10-0-50, 0-250, 0-1000, Amperes DC only; 0-10, Ohms: 0-1000, 0-10000; Megohms: 0-1, 0-100. Selector Switch provides four positions: Volts AC, Volts DC, Ohms, Amps. Range Switch has 5 positions which provide for above Voltage ranges, 4 ohm ranges, and 1 ampere range. 4' test lead has both prods and alligator clips. Has sturdy, leather carrying case.

GROWLERS

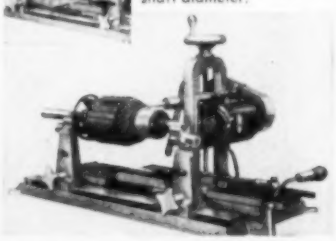
PORTABLE GROWLER TYPE U-2

This Universal Adjustable Growler may be used as both an external Growler for armatures and an internal Growler for stators. It will test armatures from 2" diameter up, and stators from 5¾" diameter up. Available with or without meter. Six other models.

BENCH-TYPE UNDERCUTTER



AT LEFT—Undercutting Vertical Commutator.
BELOW—Undercutting Horizontal Commutator. Note V-support at right raised to compensate for smaller shaft diameter.



Model HV-3 is a precision built, rugged, fast and accurate undercutter with a wider range of armature sizes and shaft lengths than any similar machine being built.

Write for New 64-page Catalog No. 29 describing these and many other products for Industrial Maintenance, Safety and Production.

MARTINDALE ELECTRIC CO.
1334 Hird Ave. Cleveland 7, Ohio

by hand. To open, release one lever, and the tank is retracted with the flip of a switch, without disconnecting pipe.

Filter plates can be spaced any distance apart to accommodate cake of any thickness, and for removal of large percentage solids.

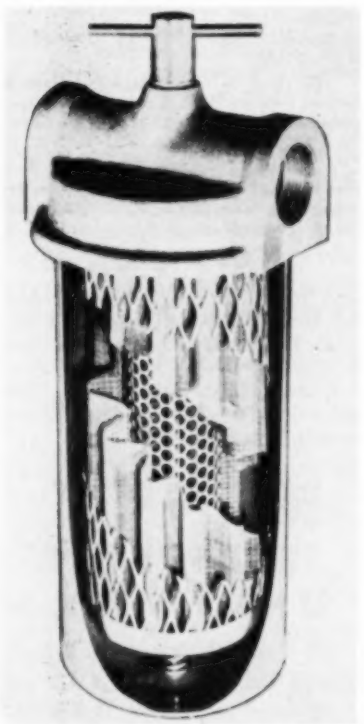
The circular double surface screen plates are reinforced to withstand extremely high filtering pressure without danger of collapsing.

Water Filters

L-22 MARVEL ENGINEERING CO., 625 W. Jackson Blvd., Chicago 6, Ill., makers of Marvel Synclinal Filters, have recently adapted all models of their sump and line type filters for water applications. No changes have been made in basic synclinal design.

Maximum active filter area, longer periods of operation, no moving parts, simplicity of maintenance and other features that have proven outstanding for Marvel in the filtration of oil in hydraulic and low pressure liquid circulating systems have been retained. Available for either sump or line installation in 8 unit sizes from 5 to 100 gpm. Greater capacities are attained by multiple installations. Mesh sizes ranging from coarse 30 to very fine 200 are available to handle various size particles.

Further particulars and complete data are included in Water Filter Catalog No. 300.



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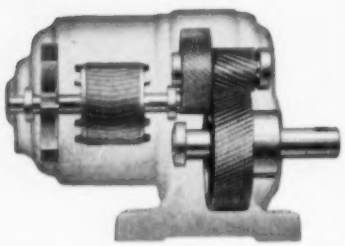
STERLING SLO-SPEED



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L-23

THE LUNKENHEIMER CO., Box 360, Cincinnati 14, Ohio, has introduced a new 125 lb iron gate valve for service in the process industries.

The cast iron body and bonnet contain 3% nickel, giving them an extra margin of corrosion-resistance. The trim, where corrosion usually does the greatest damage, is made of the most corrosion-resistant alloys used for valves—either 18-8 Mo Stainless Steel or all-Monel. The valve is priced considerably lower than valves which handle more severe corrosive conditions.

For more data circle item code number on the postage free post card — P. 17

Grounding

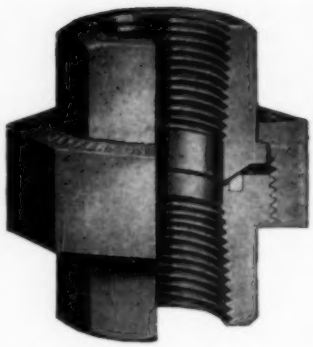
(*Starts on page 92*)

lamp bulb. What happened? The thread portion of the bulb was energized, even though the key switch was "off," and the current passed through them to reach some conducting medium such as the wet floor, plumbing or structural steel.

Never use such so-called "drop cord" as an extension cord for general use. The insulation was never intended for such abuse. The stuff is as the name implies—drop cord to reach from the ceiling box to the lighting fixture.

By the same token do not use brass shell sockets for any type of lighting in damp places, or as a socket on an extension cord. The sum total of the interior insulation is nothing more than a small cylinder of yellow cardboard. And, the interior tolerance for fastening is quite limited so that if just one strand of the fine wire escapes from the pressure of the binding screw that brass socket may readily be your private electric chair. The fine little strand, no larger than human hair, has touched the metal socket and small as it is it has killed persons so unfortunate as to make contact with a "leaky" metal socket.

If you use chain pull sockets on permanent wiring near plumbing, heating or other conducting mediums place an insulating link in that chain lest the chain and socket both carry a lethal dose down your hand.



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Diesel to Dual Fuel

(*Starts on page* 83)

tion in fuel costs from 7.8 mills to 3.6 mills per kilowatt hour. The plant load is such that the new engine can be operated practically all of the time without assistance from other equipment, but the above mentioned fuel cost reduction is for the entire plant, not just for the new engine. Since installation, the heavy-duty engine has been on the line nearly 95% of the time.

Figuring on the basis of 50 and 60 cents per gallon, June and July, 1952, showed 0.72 and 0.75 mills per kilowatt hour for lube oil costs. This was prior to operation of the O-P engine. August through November, break-in period for the new engine, averaged about 0.60 mills per kwh. The final settling of the piston rings reduced the cost to 0.37 and 0.36 mills per kwh in December, 1952, and January, 1953, respectively. December shows 4578 horsepower hours per gallon of oil.

Orientation Trend

(*Starts on page* 84)

presentation. The October session, therefore, made more effective use of time and reduced the course to 10 consecutive working days. The course consists of lecture and discussion periods, varying in length from thirty minutes to four hours, conducted by approximately 80 management and supervisory people. Plant tours and field trips supplement classroom sessions. Subjects covered include management, legal matters, public relations, insurance, tax problems, industrial relations, general service and purchasing, sales, credit and traffic; in addition to studies of operational activities in production and exploration, refining and chemical plant operations, research and others.

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The alarm mechanism on JERGUSON WATER COLUMNS is stainless steel throughout. Valve stem, cam, and knife edges are carefully hardened. A complete range of pressures and sizes, with screwed, flanged, or welding connections. There's a dependable JERGUSON WATER COLUMN to fit your requirements. ***Write for Data Unit***

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Savannah Electric

(*Starts on page* 76)

the basement, the indication of water level in the distilled water tank is reproduced on the pump board by means of a second inductance bridge receiver (extreme left of Figure 3).

Measurement of the level in the distilled water tank is accomplished by a single pressure tap at the bottom of the tank and a Brown non-indicating pressure transmitter equipped with an inductance bridge transmitting coil. Knowing the level in this tank is important since the distilled water in it constitutes the reserve used to replenish the system following soot blowing operations, etc.

Kanawha River Plant

(*Starts on page* 66)

problems. However, the volume of the steam is nearly doubled, and this necessitated unusually large intercept valves.

The two intercept valves are mounted at the top front of the low-pressure machine. Each is operated by independent hydraulic cylinders. These valves operate as shut-offs or throttling elements. A speed governor activating the intercept valves regulates over-speed of the low-pressure unit. The intercept valves and high-pressure emergency stop valves are furnished with steam sealing devices which eliminate stem-bushing leakage when the valves are in normal fully open position.

Automatically controlled water sprays are located in the low-pressure cross-over duct for attemperating the steam leaving the central flow low-pressure turbine casing. Water will be injected for all operations up to 5% of full load.

The lower half of the low-pressure turbine exhaust hood is fabricated from steel plate rather than castings, resulting in considerable savings in weight. This construction should also be more rugged and less sensitive to temperature shock. The national emergency and resulting scarcity of steel plate prevented similar construction for the upper half, so it was necessary to resort to castings for this section.

Adoption of steam seals instead of water seals is an interesting change from usual practice. These seals provide a number of operating and maintenance advantages. Greater flexibility is expected, and difficulty usually experienced in adjusting water seals while bringing units up to speed, or changing load, will be eliminated. Rapid starting will be simplified because serious thermal shock to the turbine shaft can be avoided with ease. Also, elimination of motor-operated valves and water-runner of parts required with water seal operations results in a simplified system less subject to mechanical trouble.

A high-pressure pump on the high-pressure turbine shaft furnishes all hydraulic and bearing lubricating oil for both high and low-pressure turbines. This pump is of new design, has double suction, and operates at 3,600 rpm to deliver oil at 200 psi.

Condenser

The condenser is of the single-pass divided circulation type, with 90,000 sq ft of cooling surface consisting of $\frac{7}{8}$ in. OD × 18 BWG arsenical admiralty tubes, 30 ft long. The hot well stores 1,100 cu ft. The design provides for condensate deaeration, with the standard residual oxygen guarantee of 0.03 cc per liter, but experience indicates better oxygen removal than this.

The steam-jet air ejector is of the 2-stage triple-element type with separate inter and after coolers, and each element can handle normally expected air leakage. Steam for the air ejector comes normally from the high-pressure turbine exhaust through a regulator. But during starting-up, and below half load, steam is obtained from the boiler intermediate superheater header at 2,150 psi, 900 F, and is reduced to 150 psi at the nozzles. Steam and water space priming ejectors also use steam from the intermediate superheater header, reduced to 400 psi.

Two circulating water pumps, 70,000 gpm, provide water for the condenser as well as general service water. Condensers are low enough to permit siphon operation. To reduce basement depth, circu-

lating pumps are located in the screen house at the river. Water flows through the two halves of the condenser in opposite directions, and provision is made to backwash at full load by means of two butterfly-type reversing valves, operated simultaneously by a single switch. Electrical protective features assure that the two valves operate together.

Space limitations made necessary the use of vertical circulating water pumps. A standard dry pit volute centrifugal pump design was selected. Such pumps have a proven satisfactory service record.

Electrical Generator

The 1,800 rpm double-winding generator, directly connected to the low-pressure turbine, is rated at 140,000 kva at 0.8 power factor and 0.5 pound hydrogen pressure. Under these conditions the short circuit ratio is 0.8. The 3,600 rpm generator, directly connected to the high-pressure turbine, is rated at 75,000 kva at 0.85 power factor and 0.5 pound hydrogen pressure and has a short circuit ratio of 0.7. At 30 pounds hydrogen pressure, the generator for the low-pressure unit is rated at 175,000 kva at 0.8 power factor, and the high-pressure machine is rated 93,000 kva at 0.85 power factor.

Shaft-driven exciters on each generator provide excitation current, supplemented by a motor generator set for starting up the combined generator unit. A second motor generator set is provided for emergency excitation in event of failure of main exciters. Voltage control for each unit is provided by amplidyne regulators.

The large size of the generating units necessitated selection of 18,000 volt terminal voltage, the economic upper limit in this case.

Conventional aluminum bus structures connect the 18,000 volt terminals of the generators directly to three-phase power transformers, stepping voltage up to 132 kv. Disconnect switches in the generator leads permit convenient maintenance and testing of the units.

Transformers and Circuits

Three-phase auxiliary transformers are connected to the leads of each generator winding. These transformers feed separate auxiliary bus sections, each of which has an alternate power supply from a three-phase transformer stepping down from the 132 kv bus system. The major motor drives are supplied from these buses, operating at 4,160 volts grounded neutral.

To avoid outage of major motor drives from accidental grounding of one circuit, the auxiliaries are arranged into three groups, fed by an independent source. The smaller 550 volt motors are served from buses fed by three-phase transformers connected to the main auxiliary buses.

Each of the 550 volt buses has an emergency connection to one of the other main auxiliary buses to provide flexibility and assure uninterrupted 550 volt service.

Three main power transformers serve each unit, one for the high-pressure generator and one for each of the two windings of the low-pressure generator. These transformers are bussed on the 132 kv side, and then connected to the double-bus 132 kv yard immediately adjacent through two coil circuit breakers which also serve as a bus tie.

Initially, five 132 kv feeders will lead out from the Kanawha River Plant. Each feeder has a single breaker with selector switches to the two buses and a by-pass switch to one of them, so that two 132 kv buses may be used as main and transfer bus for maintenance and emergency conditions. The three transformers are forced air, forced oil-cooled, and are located immediately adjacent to the station to give the shortest possible leads from generators to transformers. The transformers are protected by the usual differential relay setups and by low-pressure carbon dioxide fire-fighting equipment.

Provision is made in the switchyard for connecting to the new 330 kv cross-country line. A 330 kv double-bus system will take the output of future generating units, and a large transformer bank will serve as tie between the 132 kv and the 330 kv buses.

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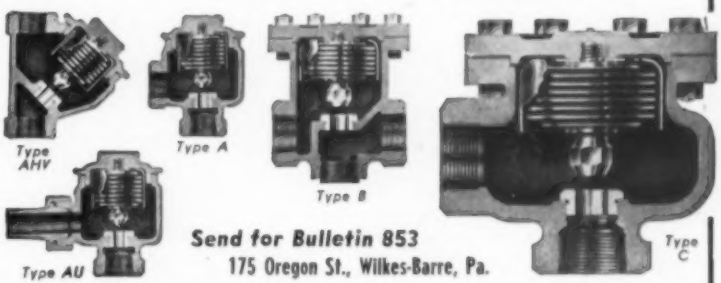

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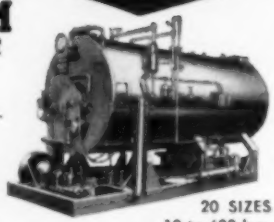

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A

Advertising Counsel, Inc. ..... •
Air Preheater Corp. ..... •
Allen-Bradley Co. 5
Allen-Sherman Hoff Co. ..... •
Allis-Chalmers Mfg. Co. ....Second Cover
American Blower Corp. .....35 and 36
American Coal Burner & Wood Stoker Corp. ..... •
American Engineering Co. ..... •
American Monorail Co. 59
American Red Cross ..... •
Ames Iron Works 136
Anaconda Wire Cable Co. 27
Armstrong Machine Works 57
Atlantic Steel Company 125
Atlas Valve Co. 107

B

Babbitt Steam Specialty Co. 140
Babcock & Wilcox (Boilers) ..... •
Babcock & Wilcox Refractory Div. 91
Bailey Meter Co. 42
Bell & Zoller Coal Co. ..... •
Bellows Co. ..... •
Belmont Packing & Rubber Co. 131
Bertram Co., Harvey P. ..... •
Bird-Archer Co. ..... •
Bituminous Coal Institute 56
Blaw-Knox Co. (Grating) 116
Blaw-Knox Co., Power Piping Division •
Boiler Tube Co. of America 135
Buell Engineering Co., Inc. ..... •
Buffalo Forge Co. ..... •
Bunting Brass & Bronze Co. 26
Bussmann Mfg. Co. .....14 and 15
Byers Co., A. M. ..... •

C

Cambridge Wire Cloth Co. 127
Carolina Refractories Co. 134
Catawissa Valve & Fitting Co. 133
Chapman Valve Mfg. Co. 62
Chicago Bridge & Iron Co. 52
Clarage Fan Co. 1
Classified Ads 137
Cleaver Brooks Co.—Boiler Division.. 103
Cochrane Corporation 48
Cole Mfg. Co., R. D. 126
Combustion Engrg., Inc. ..... •
Combustion Equipment Division Todd Shipyards Corp. ..... •
Condenser Service & Engineering Co., Inc. 46
Continental Gin Co. 7
Cooper-Bessemer Corp. ..... •
Copes-Vulcan Division — Continental Foundry & Machine Co. 58
Coppus Engineering Corp. ..... •
Crane Company ..... •
Crane Packing Co. ..... •
Custodis Construction Co. ..... •
Cyclotherm Corp. 107

D

Dart Union Co. ..... •
DeLaval Steam Turbine Co. 51
Deming Company 123
Detroit Stoker Co. 53
Dowell, Inc. ..... •
Drew & Co., Inc., E. F. 93

E

Edward Valves, Inc. 29
Electric Service Co. 137
Elgin-Refinite, Inc. ..... •
Elgin Softener Corp. ..... •
Elliott Co. ..... •
Emerson Elec. Mfg. Co. 105
Engineer Co. 117
Erie City Iron Works ..... •
Ernst Water Column & Gage Co. .. 137
Everlasting Valve Co. ..... •

F

Fairbanks Co. 121
Falk Corp. ..... •
Finnigan, J. J., Co., Inc. 140
Fisher Governor Co. ..... •
Fiske Bros. Refining Co., Lubriplate Div. 128
Flexible Steel Lacing Co. ..... •
Flexible Tubing Corp. ..... •
Frick Company ..... •

G

Garlock Packing Co. ..... •
General Coal Co. 122
General Dynamics Corp., Electro Dynamics Division ..... •
General Electric Co. .....22 and 23
Gilbert Associates, Inc. 109
Graver Water Conditioning Co. 39
Grinnell Co., Inc. ..... •
Gulf Oil Corp. .....87, 94 and 95

H

Hagan Corp. (Boiler Water Conditioning) 37
Hagan Corp. (Combustion Control).. •
Hall Laboratories, Inc. 37
Hotel Pittsburgher ..... •

I

Industrial Crane & Hoist Corp. 108
Industrial Equipment Co. 9
Infilco Incorporated 99
Ingersoll-Rand Co. ..... •
International Chimney Corp. 34
Iron Fireman Mfg. Co. ..... •
Ironton Fire Brick Co. 124
I-T-E Circuit Breaker Co. .....40 and 41

J

Jacksonville Blow Pipe Co. 136
Jefferson Union Co. 130
Jenkins Bros. ..... •
Jerguson Gage & Valve Co. 132
Johns-Manville, Inc. 55

K

Kellogg Company, M. W. 97
Kennedy Valve Mfg. Co. ..... •
Kewanee-Ross Corp. 129
Kirk & Blum Mfg. Co. 140

L

Ladish Co. ..... •
Leffel & Co., The James ..... •
Leibfried Mfg. Corp., C. H. ..... •
Leslie Co. ..... •
Liberty Engineering & Mfg. Co. 140
Lindberg Engineering Co. 20
Link-Belt Co. 32
Lovejoy Flexible Coupling Co. 112
Lubriplate Division, Fiske Bros. Refining Co. 128
Lucey Boiler & Mfg. Corp. 19

M

McAlear Manufacturing Co. 31
Madden Corp. ..... •
Manning, Maxwell & Moore, Inc. 50
Manzel, Inc. 111
Martindale Electric Co. 128
Mason-Neilan Regulator Co. ..... •
Midwest Piping Co., Inc. .....Third Cover

N

National Airoil Burner Co. 134
National Aluminate Corp. ..... •
National Tube Co. 38
National Valve & Mfg. Co. 24
Nebel Machine Tool Co. ..... •
Niagara Blower Co. 118
Nicholson & Co., W. H. 135

O

Ohio Injector Co. ..... •
Okadee Mfg. Co. 120
Okonite Co. 101
Orr Sembower, Inc. 85

P

Pacific Pumps, Inc. 115
Peerless Boiler & Engineering Co. 139
Peerless Pump Division Food Machinery & Chemical Corp. ..... •
Permutit Co. .....Fourth Cover
Petro 43
Philadelphia Gear Works 11
Pittsburgh Piping & Equipment Co. .. •
Pibrico Company 119
Powell Valves 45
Powers Regulator Co. 110
Prat-Daniel Corp. ..... •

R

Raybestos-Manhattan, Inc., Packing Division ..... •
Rectorseal Division Rector Well Equipment Co., Inc. ..... •
Reliance Gauge Column Co. 113
Republic Flow Meters Co. ..... •
Richardson Scale Co. ..... •
Riley Stoker Corp. ..... •
Rust-Oleum Corporation ..... •

S

Sarco Co., Inc. 61
Shell Oil Co. 25
Sinclair Refining Co. 60
Southern Railway System 49
Sprague Electric Co. 139
Standard Oil Co. of Ky. 33
Sterling Electric Motors, Inc. 130
Stone & Webster Engineering Corp... •
Subox, Inc. ..... •

T

Taylor Forge & Pipe Works 44
Terry Seam Turbine Co., The 28
Texas Co. 2
Todd Shipyards Corp., Combustion Equipment Division ..... •

U

Union Asbestos & Rubber Co. 47
U. S. Hoffman Machy. Corp. 139
United States Steel Co. 38
U. S. Treasury ..... •

W

Wagner Electric Co. 30
Walworth Co. 54
Want Ads 137
Webster Engineering Co. ..... •
Western Precipitation Corp. ..... •
Westinghouse Electric Corp. (Apparatus Div.) .....12 and 13
Whiting Products 134
Wickes Boiler Co. 21
Wiegand Co., Edwin L. ..... •
Wiggins Co., John B. 134
Wilson, Inc., Thomas C. ..... •
Wing Mfg. Co., L. J. ..... •
Worthington Corporation 64

Y

Yarnall-Waring Co. 89

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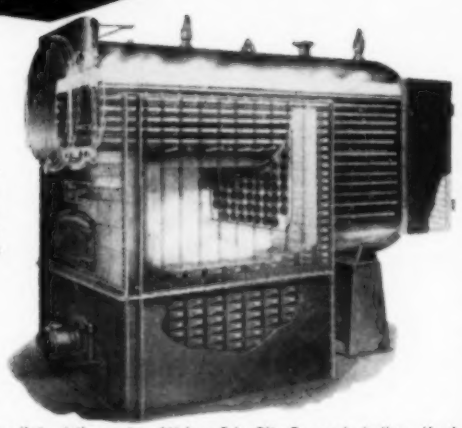

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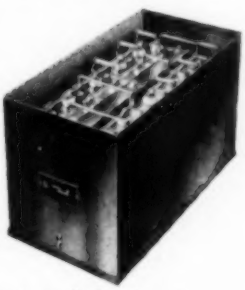

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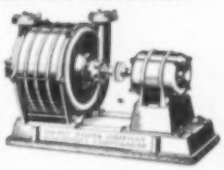

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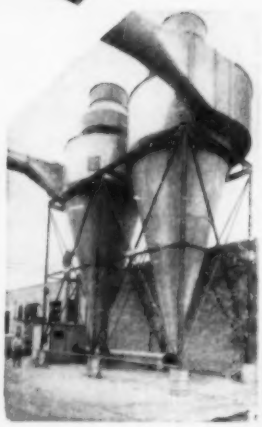

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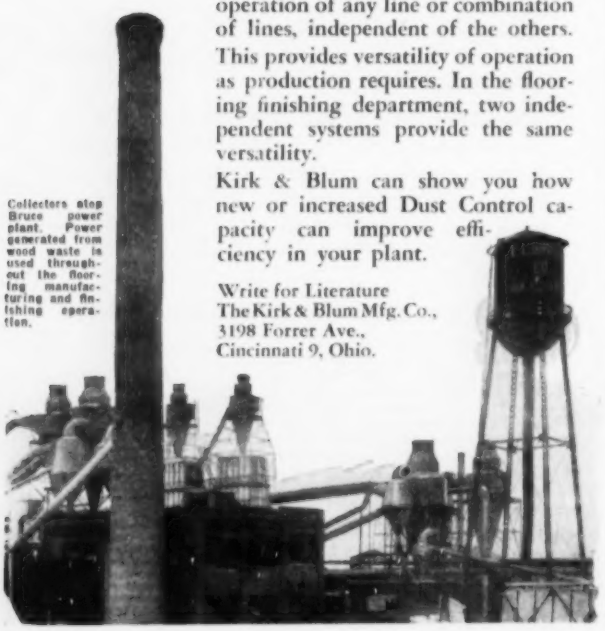

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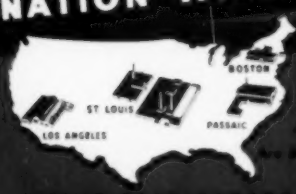

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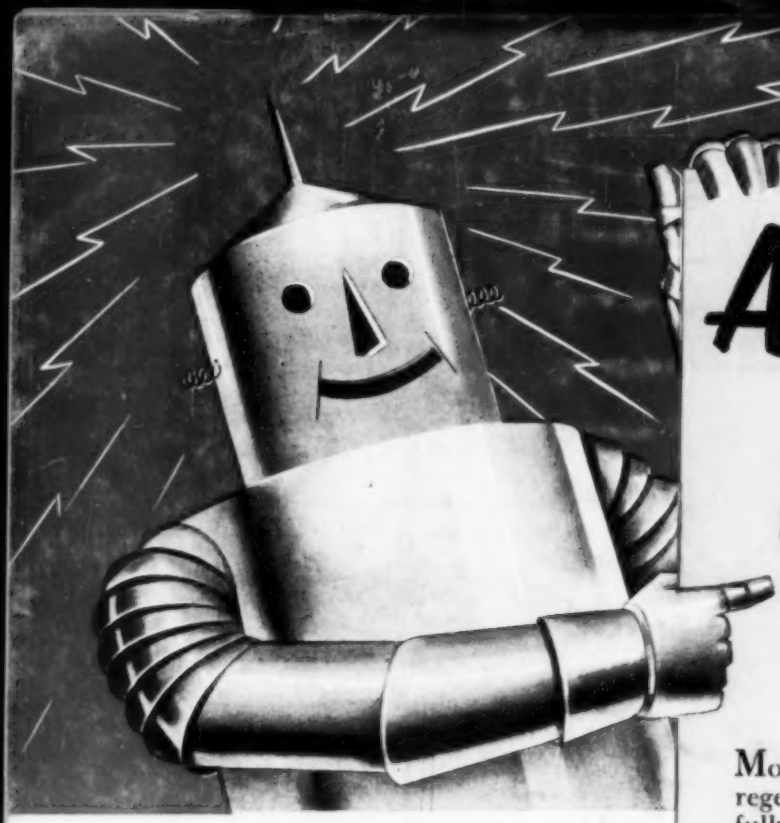

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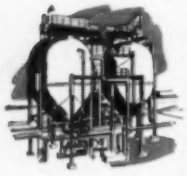
OTHER BASIC WATER CONDITIONING PROCESSES



Sludge Blanket Hot Lime Soda

Full utilization of Permutit sludge-blanket principle assures high efficiency. Reduces hardness to region of 20 ppm . . . silica to 2.0 ppm. Lowers alkalinity . . . removes wide variety of solids.

Hot Zeolite—Permutit Q

Permutit Q—a styrene base resin resistant to high temperatures and pH values—replaces second stage phosphate treatment in hot-process softener. Results—residual hardness is completely removed at great savings in phosphate costs.

Deaerating Heater

Removes objectionable oxygen and CO_2 to prevent corrosion and pitting of feed lines, stage heaters, economizers, and boilers at high temperatures. Steam is used twice . . . deaerates water completely.

Precipitator

Softens water on space and time-saving sludge-blanket principle. Simultaneously removes turbidity, color, fluorides, reduces silica and lowers alkalinity.

PERMUTIT®

ION EXCHANGE AND WATER CONDITIONING HEADQUARTERS FOR OVER 40 YEARS